

Source Water Assessment & Protection

WORKSHOP GUIDE

SECOND EDITION

Sponsored by The Groundwater Foundation

Funding Provided by United States Environmental Protection Agency

Developed by Rachael Herpel, The Groundwater Foundation

Layout and Design by Carla Mansfield, The Groundwater Foundation

Technical Review by Stephanie Lindberg, United States Environmental Protection Agency Region VII



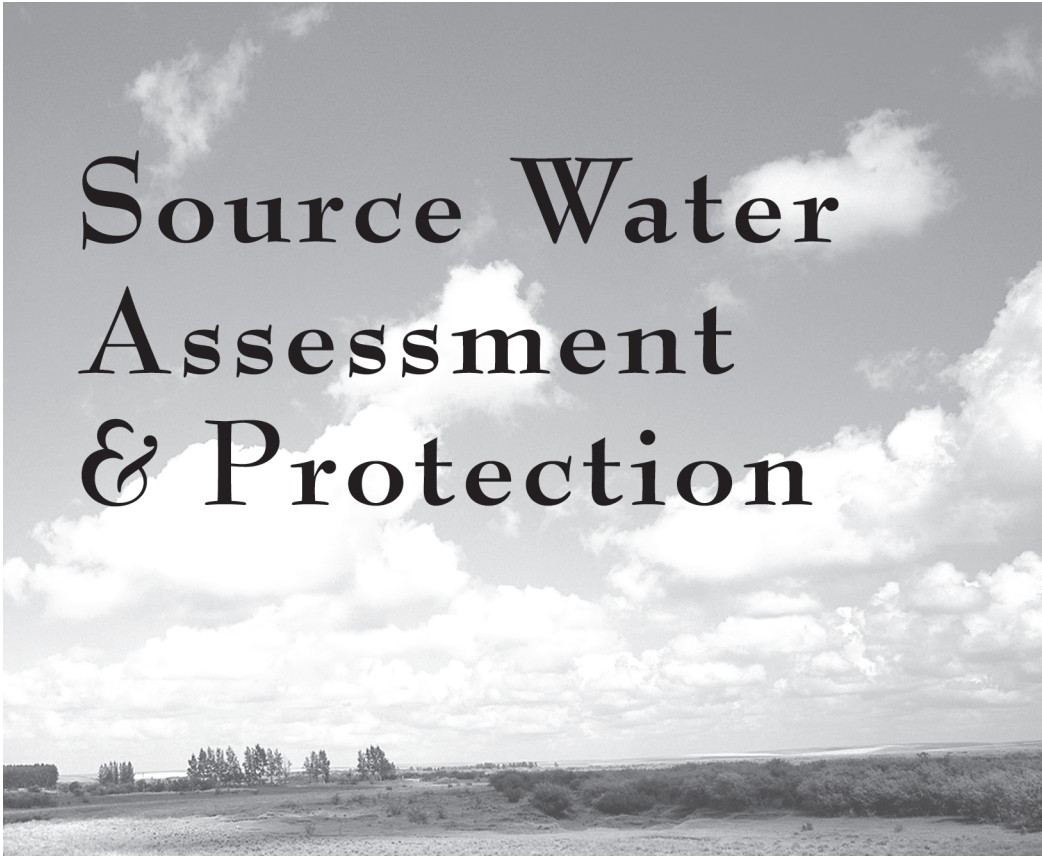
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The Groundwater Foundation is a nonprofit educational organization that has been actively promoting public awareness about groundwater issues since 1984. The Foundation's mission is to educate and motivate people to care about and for groundwater.



Source Water Assessment & Protection

WORKSHOP PRESENTER MATERIALS SECOND EDITION

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Workshop Basics



WORKSHOP GOAL

This workshop is designed to provide community representatives with information about a major initiative to protect the nation's drinking water - source water assessment and protection.

After attending this workshop, community representatives will have the knowledge and resources to provide leadership in the source water assessment and protection process and share information about the source water assessment and protection process with others in their communities.

WORKSHOP OBJECTIVES

This workshop is broken down into seven parts. The objectives of each part are to teach workshop participants to:

PART ONE: Introduction to Source Water Assessment and Protection

1. Identify their community's source of drinking water or have the knowledge to return to their community and make the right contacts to identify their community's drinking water source;
2. Define source water assessment;
3. Define source water protection;
4. Understand how drinking water has been protected in the past and how we as a nation have gotten to this point in source water protection; and
5. Recognize what their community has already done to protect their source water and how previous programs and activities, especially those conducted as part of a wellhead protection program, may be incorporated into future source water protection efforts.

PART TWO: Source Water Assessment

1. Identify the four steps of the source water assessment process required by the 1996 Safe Drinking Water Act amendments;
2. Understand the specific requirements of each step of the source water assessment process; and
3. Identify existing resources and partners that may be useful during each step of the source water assessment process.

PART THREE: Source Water Protection

1. Identify the benefits of source water protection;
2. Define contaminant source management and recognize it as a component of source water protection;
3. Recognize basic methods of contaminant source management, some of which may currently be used in their community;
4. Define methods of contingency planning and recognize it as a component of source water protection; and
5. Recognize basic methods of contingency planning, some of which may currently be available in their community.

PART FOUR: Source Water Protection - Case Studies

Identify existing programs that may be used to facilitate elements of the source water assessment and protection process

PART FIVE: Source Water Protection - Small Group Activities

Actively think about source water protection strategies that may address potential contamination concerns in their community and how to implement them.

PART SIX: Source Water Protection - Implementation Assistance

Identify sources of technical and financial assistance that may be used to implement the source water protection strategies developed in Part Five of this workshop guide.

PART SEVEN: Source Water Protection - Evaluation

Evaluate the workshop and the source water assessment and protection activities that follow.



Communities will also learn how their source water assessment and protection activities can be adopted as Result-Oriented Activities to earn them designation as Groundwater Guardian Communities. Groundwater Guardian is a program of The Groundwater Foundation which supports, recognizes, and connects communities working to protect groundwater. For more information about Groundwater Guardian, contact The Groundwater Foundation at 1-800-858-4844 or visit www.groundwater.org/gg/gg/html.



TARGET AUDIENCE

Community representatives who are interested in groundwater, surface water, and drinking water quality and would like to learn more about and get more involved in the source water assessment and protection process in their community may use this training module to introduce and involve other community members in the process. Interested community representatives could include:

- ◆ 4H Club members
- ◆ Church group representative
- ◆ Civic group representative
- ◆ Cooperative extension educators
- ◆ Engineering and/or environmental consultants
- ◆ Environmental group representative
- ◆ Farm group representative
- ◆ Girl or Boy Scouts
- ◆ High school science teacher or science club
- ◆ High school student
- ◆ Local agricultural producer
- ◆ Local business person
- ◆ Locally elected official
- ◆ Local employers, both large and small
- ◆ Local media
- ◆ Other community group representatives
- ◆ Partner in a nearby town
- ◆ Public water system operator
- ◆ Retiree
- ◆ Rural water system operator
- ◆ Soil and water district representative
- ◆ Stay-at-home parent

Workshop Materials



SECTION I: Workshop Presenter Materials

The workshop presenter materials are a tool for individuals who wish to introduce their community to the information provided in their local source water assessment and use that information to develop protection strategies.

Parts One through **Three** of the workshop presenter materials begin with a lesson plan that lists the topics to be presented, training materials (i.e. overheads and handouts) needed for each topic, and the estimated delivery time. Below each topic overhead is background information that may be used by the workshop presenter to supplement the information presented on the overhead and in the participant materials. **Parts Four** through **Seven** contain resources meant specifically for the workshop presenter. These resources may be used to develop materials specific to the workshop participants' needs.

The workshop presenter materials are a guide. The most successful workshops are ones that adapt to the needs of the participants. It is critical that state-specific and/or location-specific information be included. For more information, contact the agency or organization in your state that is responsible for administering your state's source water assessment program or your public water system. A complete listing of the state source water protection contacts is available on the United States Environmental Protection Agency (USEPA) Office of Groundwater and Drinking Water website at www.epa.gov/ogwdw/source/contacts.html.

All parts of this workshop do not have to be presented together. The workshop presenter must choose which components of the source water assessment and protection process are most interesting and valuable to the audience, especially when the presenter does not have time to present the entire workshop. In other cases, the presenter may need to add situation-specific materials to their workshop and explore certain topics in-depth. Nevertheless, on the following page is an agenda for a typical workshop presented using these materials.

The Groundwater Foundation's Source Water Assessment and Protection brochure may also be used during the workshop to support its content. To obtain copies of the booklet, contact The Groundwater Foundation at 1-800-858-4844 or visit the catalog section of The Groundwater Foundation's website, www.groundwater.org.



Tip for Workshop Presenters

Below is an example of a typical Source Water and Assessment Protection Workshop agenda when hosted by The Groundwater Foundation.



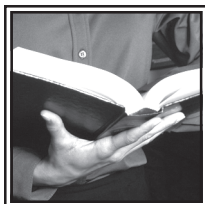
Source Water Assessment and Protection Workshop

AGENDA

8:30 a.m.	Registration
9:00 a.m.	Part One: Welcome and Introduction
9:30 a.m.	Part Two: Source Water Assessment
10:30 a.m.	Part Three: Source Water Protection
11:30 a.m.	Part Four: Source Water Protection – Case Studies
12:00 noon	Lunch
1:00 p.m.	Part Five: Source Water Protection – Strategy Development and Implementation using Small Group Activities (All on the Wall and Decision Grid)
2:00 p.m.	Part Six: Source Water Protection – Implementation Assistance
3:00 p.m.	Adjourn (Part Seven: Evaluation [Index Card Method])

SECTION 2: Overheads

A complete set of overheads may be found in Section 2. The overheads are also available in Power Point. To receive a Power Point copy of the overheads as an email attachment, send a request for SWAP overheads to SWAP@groundwater.org.



SECTION 3: Handouts

A series of handouts have been developed to supplement specific sections of the workshop. The workshop presenter may make copies of the handouts and distribute them to supplement the core material and/or prompt discussions on particular subjects. A complete set of handouts may be found in Section 3.

SECTION 4: Participant Materials

The participant materials include the workshop overheads and text written especially for them. The text used is straightforward and highlights opportunities for participants to get involved in source water assessment and protection. The participant version also provides space to take notes. A set of the participant materials should be copied and provided to each workshop participant. The participant materials may be found in Section 4.

A variety of symbols are used throughout the workshop presenter and participant materials to bring attention to specific information, suggestions, reminders, and discussion points that may be used by the workshop presenters and participants. A Table of Symbols used in the Workshop Guide is on the following page.

Additional Workshop Presenter Resources

Additional workshop presenter resources are available through USEPA's Drinking Water Academy at www.epa.gov/ogwdw/dwa.html and Watershed Academy at www.epa.gov/owow/watershed/wacademy.

Table of Symbols

The following symbols have been included to identify items of particular interest. Their borders help set them apart from other graphics included in the workshop guide to create visual interest. Sections of the text not associated with a symbol are intended for both the workshop presenter and workshop participants.



Workshop Presenters

This material is written specifically for you, the workshop presenter, and contains information, background material, and references to background material that you should gather and use to supplement the participant materials. Often an expert's perspective and/or state and/or location-specific information can also be used to supplement the materials.



Workshop Participants

This material is written specifically for workshop participants and highlights an opportunity for their involvement in the source water assessment and protection process.



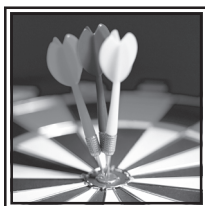
Discussion Point

When you see this lively symbol, take a moment to stop and pose a question to the group. Participants are more likely to remember and apply the information presented if they have a chance to discuss it, ask questions, and get an idea of how they can take action in their own community.



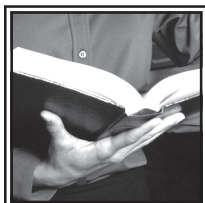
Tips for Workshop Presenters

These tips will help you to better prepare for the workshop by identifying areas where a group activity or specific information may be a valuable addition to the workshop.



Major Point to Remember

Just like it says, this icon identifies information that you and the workshop participants may want to tack up and remember as you get more involved in source water assessment and protection.



Optional Training Materials

Handouts have been developed to supplement specific sections of the workshop. The workshop presenter may make copies of the handouts and distribute them along with the participant materials or hand them out as topics are discussed.

Presenter Tips



The Room

Make sure you have a room that will accommodate the number of participants you have. To maximize the participants' experience, limit the amount of participants to no more than twenty-five. A group of that size can still interact freely and share ideas without overwhelming the workshop presenter.

The Lighting

A well-lit room tends to create a more interactive atmosphere. A dark room with an overhead projector shining up front is too much like a classroom or a lecture hall. Keep the lights on so participants can see each other, see you, and see special guests. Participants should still be able to see the overheads. If they cannot see the overheads, dim the lights a touch and remind them that they have copies of the overheads in their participant materials.

The Temperature

Nothing detracts more from a workshop than a room that is too hot or too cold. Make sure you have a room where you control the temperature. If not, work with the facility managers to make the room comfortable for workshop participants.

The Logistics

Add to the comfort level of the participants by letting them know the location and availability of restrooms, drinking fountains, telephones, and perhaps even a fax machine, smoking area, or vending machines. Also make sure the participants know the length of the workshop and, if any breaks are scheduled, their frequency and length.

The Discussions

Encourage discussions throughout the workshop. Respond to the needs of the workshop participants by supporting the discussion of topics they find interesting. Here the workshop presenter serves as a facilitator by encouraging and leading the discussion, rather than dictating it. If one participant seems to be driving the discussion, draw other participants into the discussion by asking them to share their insights and experiences.

If a participant leads the group away from the topic at hand, recognize their interest and take time to revisit their topic at a later time. For example, you might say, "You must feel strongly about this issue and I can understand why you feel strongly; however, it is outside the scope of this discussion. Let's write this issue down and revisit it when we have finished the current topic."



The Experts

Invite special guests as experts to supplement the material presented. When participants have specific questions, refer to the experts. Help the experts focus on the question and make sure the participants understand and are satisfied that their question was answered, even though they may not agree with the answer. If the expert does not have the answer to a question, the expert should not be asked to speculate. Instead talk about who could answer the question and offer to help connect the participant to this information source.

Workshop participants will appreciate the straightforward approach and presentation of the material; it reinforces the idea that source water assessment and protection is something they can and should get involved with. Having the expert available to be a resource and “fill in the gaps” adds a great deal to the content, but the expert should not necessarily lead the discussion. The workshop presenter should maintain the role of facilitator throughout the workshop.

Part One

INTRODUCTION TO SOURCE WATER ASSESSMENT AND PROTECTION

Goal

To introduce definitions, historical information, and concepts as a foundation to understanding and getting involved in the source water assessment and protection process.

Topic	Material
Welcome	Overhead 1-1 Handout 1-1
Protecting Drinking Water Sources	Overhead 1-2
Source Water Assessment Process	Overheads 1-3, 1-4
Source Water Protection	Overheads 1-5, 1-6
Safe Drinking Water - The Early Years	Overhead 1-7
Safe Drinking Water Act	Overheads 1-8, 1-9, 1-10 Handout 1-2
Clean Water Act	Overhead 1-11
SDWA/CWA	Overhead 1-12
Public Involvement: A Continuous Theme	Overhead 1-13

Suggested Time
30 minutes



Workshop Presenters

Part One is designed to give workshop participants a basic introduction to source water assessment and protection definitions, concepts, and requirements. Supplemental material is included and may be used to review how drinking water has been protected.

Upon completion of **Part One**, participants will be able to:

1. Identify their community's source of drinking water or have the knowledge to return to their community and make the right contacts to identify their community's drinking water source;
2. Define source water assessment;
3. Define source water protection;
4. Understand how drinking water has been protected in the past and how we as a nation have gotten to this point in source water protection; and
5. Recognize what their community has already done to protect their source water and how previous programs and activities, especially those conducted as part of a wellhead protection program, may be incorporated into future source water protection efforts.

Welcome



Welcome to The Groundwater Foundation's Source Water Assessment & Protection Workshop

Overhead 1-1



Workshop Presenters

The workshop presenter materials include a great deal of background information you can use to supplement the participant materials and the workshop participant text (see below). This information will be valuable to you and the workshop participants as you get more involved in your community's source water assessment and protection efforts.



Workshop Participants

Welcome to The Groundwater Foundation's source water assessment and protection workshop. This workshop is designed to provide community representatives such as yourself with information about a major initiative to protect the nation's drinking water - source water assessment and protection.

After attending this workshop, you will have the basic knowledge and resources to provide leadership in the source water assessment and protection process and share information about the source water assessment and protection process with others in your community.

This is your opportunity to see how your community can take advantage of, and get involved in, this national water education and protection effort!



Tips for Workshop Presenters

The following workshop presenter tips offer ideas on how to get to know your workshop participants and begin the workshop.

Have the welcome slide (Overhead 1-1) up as you prepare your room for the workshop. Having the slide clearly visible will help workshop participants locate the room and verify that they are in the right place!



Workshop Presenters

After you have welcomed your workshop participants, ask the participants to introduce themselves, share where they are from, and share their affiliation or role(s) in their community. Also ask the participants to tell the group about their drinking water source, any source water protection activities going on in their community, and what they hope to achieve by attending the workshop. If workshop participants seem reluctant to share information about themselves, explain that knowing more about them will help you to identify items in the workshop that should be of the most interest to them.

Listen carefully to what the workshop participants say. Make every effort to understand the workshop participants' perspectives, their previous experiences with source water assessment and protection, and what they expect to gain from participating in the workshop. Get an idea of how many participants have already been involved in groundwater, surface water, and drinking water protection to assess the knowledge level of the group. Whether you have experts or beginners or a combination of both, all have a unique perspective and experiences they can and should share with the group.

Some workshop participants may not be served by a public water system, but rather are supplied with water from a private well on their property. Water from private wells is not monitored, tested, or regulated by any public entity. Dependence on private well water means that the well owner needs to take responsibility for knowing about the quality of the water and safeguarding it from contamination. Farm*A*Syst and Home*A*Syst are excellent and appropriate tools to assist private well owners with this process. For more information about Farm*A*Syst and Home*A*Syst, contact your state cooperative extension service or visit www.uwex.edu/farmasyst.



Tips for Workshop Presenters

Additional welcome activities may include:

1. Displaying a United States Geological Survey topography or other detailed map of the region and asking workshop participants to insert a pin at the location where they live or work. Then discuss how close they are to potential and actual sources of drinking water. Was anyone surprised by how close or far away they are from their drinking water source?
2. If you have access to the Internet, visiting the United States Environmental Protection Agency Surf Your Watershed website at www.epa.gov/surf. Visitors can use their zip code to locate their drinking water source and learn more about local water quality.
3. Sharing specific information about the number and type of public water systems in the state. Find out approximately how many public water systems get their water from groundwater, surface water, or a combination of both. Present this information to the workshop participants in a handout. See the sample handout developed by Nebraska's state environmental agency for an example of the information you may want to include in your own handout. (**Handout 1-1: Sample State Information**)



Workshop Presenters

Now is a good time to discuss the logistics of the workshop. Let the workshop participants know how much time will be set aside to work through each part of the workshop and whether there will be any breaks, the length of the breaks, whether refreshments will be served or are available from vending machines, etc.

A suggested time is offered for each part of the workshop; however, the times are only suggestions and the length and content of the workshop is entirely up to you.

Protecting Drinking Water Sources

Assessments
lead to
PROTECTION

Communities
learn to
ACT

Overhead 1-2



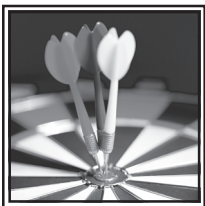
Workshop Presenters

Part One is a basic introduction to source water assessment and protection. While every public water system has or will receive a completed source water assessment from their state drinking water agency, it is important to recognize that different communities will be at different stages of the assessment and protection process. Individual communities may be in the early stages of managing their drinking water sources. Others may have worked with drinking water protection for many years. Nevertheless, the requirements of the 1996 Safe Drinking Water Act Amendments will impact how communities and the states communicate with the public and involve the public in the source water protection process.



Workshop Participants

In **Part One** of this workshop, we will define source water assessment, source water protection and learn a little bit about the 1996 Safe Drinking Water Act Amendments, which is the federal legislation that inspired all this activity. Citizens, such as yourselves, must take an interest and learn how to get involved in order for the assessments to be utilized and lead to long-lasting source water protection.



Major Point to Remember

If you remember anything from this workshop, you should remember the difference between source water **ASSESSMENT** and source water **PROTECTION**:

Source water **ASSESSMENT** is required by law - it is the responsibility of state government. Source water **PROTECTION** is entirely voluntary - communities and citizens must work to make it happen.

Assessment is the process undertaken by state drinking water agencies on behalf of communities to help them learn about their drinking water and their drinking water source. Once sound, science-based information is gathered and understood, a community is better prepared to take action to protect their drinking water.

Source Water Assessment Process

Step One: Identify the Drinking Water Source

Step Two: Identify Sources of Potential Contamination

Overhead 1-3

WHAT IS SOURCE WATER ASSESSMENT?

Source water assessment is a process of gathering information and processing data to learn about a community's source of drinking water. The information should tell residents where their water supply comes from and what conditions and/or practices *may* pose threats to its quality. This information can then be used to develop a plan or strategies to protect the community's water supply.



The Source Water Assessment process includes:

1. Identifying the Drinking Water Source
2. Identifying Sources of Potential Contamination
(This includes actual sources of contamination also.)
3. Assessing How Susceptible the Drinking Water Source is to Contamination
4. Making Source Water Assessments Available to the Public



Tip for Workshop Presenters

Take a moment to make sure everyone is comfortable with this terminology -- often participants may have questions about each step and may ask for a brief definition. Answer their questions and reassure them that you plan to cover each step more in-depth in **Part Two** of the workshop.

Source Water Assessment Process

Step Three: Assess How Susceptible the Drinking Water Source is to Contamination

Step Four: Make Assessments Available to the Public

Overhead I-4



Ideally, the assessment process brings together drinking water experts with locally-elected officials, the business community, agricultural producers, educators, and citizens. When a variety of people are actively involved in the assessment process, the community is better educated about their drinking water source and has the knowledge to protect it.

Drinking water experts at the state and local level, such as employees of your state environmental protection agency, public water supplier and/or health department, may have been charged with conducting the assessments and/or guiding communities through the source water assessment process. Contact these state and local officials for more information about your state's source water assessment program.



Tip for Workshop Presenters

Find out who has been responsible for conducting source water assessments in your state and share this information with the workshop participants. In some cases the agency or department may have a brochure or fact sheet to tell the public about what they do and how their source water assessment program complements other state and local programs, especially existing wellhead protection programs. Obtain copies of these brochures and/or fact sheets and hand them out to the group. If you have a state or local expert on hand, let the workshop participants know they may ask additional questions of them at the break.

Source Water Protection

Contaminant Source Management:

Keeping Potential Contaminants Away from the Drinking Water Source

Contingency Planning:

Establishing a Plan of Action in Case of an Emergency

Overhead 1-5

SOURCE WATER PROTECTION INVOLVES TWO KEY COMPONENTS - BOTH ARE EQUALLY IMPORTANT:

1. **Contaminant Source Management** involves a community adopting strategies, programs, and laws to make sure that contaminants do not reach the drinking water source. The goal is to prevent contamination and maintain the quality of the drinking water source.
2. **Contingency Planning** is used to develop community-based alternative action plans for drinking water emergencies, contamination events, or water system failure. Contingency planning also includes planning for new or additional sources of drinking water to accommodate population growth and increases in demand.



Workshop Presenters

From regular testing required by the state health department or an administrative order, a community may discover that certain drinking water sources have quality problems, such as elevated nitrate levels or trace elements of metals or other toxins. If this happens, the state may determine that the drinking water source presents a threat to the public health. If this determination is made, alternative drinking water sources must be made available immediately. These alternative sources may include bottled water, use of point-of-entry or point-of-use treatment, or imported water from a nearby community. This is only a short-term solution, however, and another permanent drinking water source should be found. Once alternative sources are found, the source water assessment and protection process needs to be implemented as soon as possible.



Workshop Participants

An effective drinking water source protection program, if implemented, may be able to prevent the need for water treatment and/or the development of new water supplies. Consequently, protecting drinking water sources and preventing contamination could save a community from spending a great deal of money!

Source Water Protection

A lasting commitment to clean,
safe drinking water!



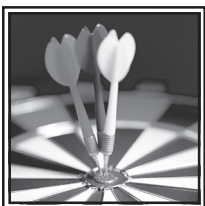
Overhead 1-6



The intention behind the 1996 Safe Drinking Water Act amendments that require source water assessments was to provide information to the public and local decision-makers so that they may make educated decisions about how to protect their drinking water sources. Modern treatment technologies are available to provide clean, safe drinking water to all Americans served by public drinking water systems; however, the costs associated with treating drinking water for a variety of contaminants may be avoided if source water is protected in the first place. Source water protection makes sense.



Source water protection is the lasting commitment to clean, safe drinking water. Without a lasting commitment, ideally established during the assessment process, chances are that no knowledgeable and interested group of citizens will be there to take the results of the assessments and translate them into effective, protective measures at the local level.



Major Point to Remember

Without a doubt, source water protection should be an extension of the source water assessment process and a direct result of citizens developing an understanding and a desire to protect the source of their drinking water.



Discussion Point

The USEPA has set a goal that by 2008, 50% of source water areas (both surface and groundwater) for community water systems will achieve “minimized risk” to public health by substantial implementation of source water protection strategies. By 2002 an estimated 5% of source water areas had achieved minimized risk. Do you think 50% is a reasonable goal? What can be done to help reach this goal?

Safe Drinking Water - The Early Years

State public health agencies fight water-borne disease beginning in the early 1900s

States adopt multiple barrier approach:

- ♦ Prevent or treat drinking water contamination
- ♦ Focus on treatment and distribution (cross-connection control)
- ♦ Routine sanitary surveys

Overhead I-7



Occasionally workshop participants may comment that “safe drinking water is a pretty basic thing - isn’t someone taking care of this already?” To address this question and to put current source water protection efforts in perspective, the following is a brief overview of the history of safe drinking water in the United States.

In the early 1900s, state public health agencies began to protect sources of drinking water in response to widespread epidemics attributed to drinking water contamination from pathogens. By the mid-1900s, state public health departments were well-established regulatory agencies.

The state programs used a multiple barrier approach to prevent or treat drinking water contamination. The first barrier was the selection and protection of an appropriate source. For surface sources, this meant locating and constructing water intakes to ensure little or no contamination from fecal bacteria. For groundwater sources, this meant constructing wells in appropriate locations, at appropriate depths, and with approved construction methods (e.g. casing and grouting).

Other barriers included treatment (selected to be appropriate to the quality of the source water) and distribution (to promote the full circulation of water and avoid stagnant water conditions that might facilitate microbial contamination). The integrity of distribution systems was periodically checked to avoid any type of cross-connection whereby untreated or contaminated water might enter the system.

One method to implement the multiple barrier approach was to conduct routine sanitary surveys. Sanitary surveys require state sanitarians or engineers to inspect water systems and check all components of the system from source to tap. Sanitary surveys have identified numerous problems and potential problems, thereby preventing the contamination of source water.

For more information about the hazards of cross-connections, refer to the *Cross-Connection Control Manual* at www.epa.gov/safewater/crossconnection.html or *Potential Contamination Due to Cross-Connections and Backflow and the Associated Health Risks: An Issues Paper* at www.epa.gov/safewater/tcr/pdf/cross.pdf.

For more information about the sanitary surveys conducted in your state, contact your state public health agency.



Discussion Point

Is anyone familiar with cross-connection control and/or sanitary surveys? If so, what is your experience with these safe drinking water programs?

Safe Drinking Water Act

Passed in 1974 to protect the nation's drinking water quality



Authorized the USEPA to:

- ♦ Identify contaminants
- ♦ Establish drinking water standards and maximum contaminant levels (MCLs)

Overhead I-8

The **Safe Drinking Water Act (SDWA)** was first passed in 1974 to protect the quality of drinking water in the United States. This law focuses on all waters actually or potentially designated for drinking use, whether from above ground or underground sources.

The SDWA authorized USEPA to identify contaminants and to establish drinking water standards for public water supplies. All owners or operators of public water systems are required to comply with primary (health-related) standards. State governments, which assume this power from USEPA, also encourage attainment of secondary or aesthetic standards (nuisance-related standards, e.g. taste and odor). Standards are enforced by testing the water supplied by public water suppliers to customers and measuring samples against established maximum contaminant levels (MCLs). These standards apply to public water supplies only, but are also being used as guidelines to assess contamination of private wells.

For a current list of contaminants regulated under the SDWA and their MCLs, contact USEPA's Safe Drinking Water Hotline at 1-800-426-4791 or visit www.epa.gov/safewater/mcl.html.

This law established consistent standards for contaminants found in drinking water. The SDWA is credited with bringing about improvements in public health and standardizing water quality across many water systems; however, the emphasis in the law has traditionally been on monitoring and treatment, not maintaining quality through source water protection.

Safe Drinking Water Act

1986 Amendments to the Safe Drinking Water Act (SDWA):

Wellhead Protection

- ♦ Completely non-regulatory
- ♦ Directing federal dollars to areas most in need
- ♦ For small systems, prevention is much cheaper than treatment

Underground Injection Control

Sole Source Aquifer Designations

Overhead I-9

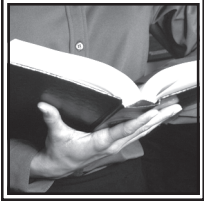
Wellhead protection has been promoted by the federal government since 1986 - long before the source water assessment and protection program was developed. Wellhead protection programs include provisions to protect the surface and subsurface areas around public drinking water wells and offers communities a cost-effective means of protecting vulnerable groundwater supplies. Wellhead protection is significant because the majority of water systems in the United States rely on groundwater as their source of drinking water.



According to *Factoids: Drinking Water and Ground Water Statistics for 2002* published by the USEPA, a total of 53,437 community water systems serve 267,722,666 people in the United States. Groundwater is the source for 78% of those systems (41,691). Most community water systems are small systems - 93% serve fewer than 10,000 people. While groundwater serves a majority of the community water systems, these systems serve only 20% of the total population. It makes more sense financially for the small systems to prevent contamination than to invest in massive infrastructure to treat it.

The 1986 amendments also initiated a more rigorous and rigid approach that brought many more contaminants under regulatory control. In addition, the SDWA authorized USEPA to regulate the underground disposal of wastes in deep and shallow (Class V) wells, and designate areas that rely on a single aquifer for their water supply. The rigid structure of the law and the continuing emphasis on monitoring and treatment made more revisions necessary.

For more information about the federal underground injection control program, visit www.epa.gov/safewater/uic.html. For more information about the sole source aquifer program, visit www.epa.gov/safewater/ssanp.html. For more information about both, contact USEPA's Safe Drinking Water Hotline at 1-800-426-4791.



Optional Training Materials

Some workshop participants may be interested in a more complete history of the federal laws and programs that serve to protect drinking water sources. **Handout 1-2:** Additional Federal Laws and Programs that Contribute to Source Water Protection may be copied and distributed to provide more information.



Discussion Point

(Corresponding to **Handout 1-2**)

Who is familiar with these programs?

How have they been used in your community?

Safe Drinking Water Act

1996 Amendments to the Safe Drinking Water Act (SDWA):



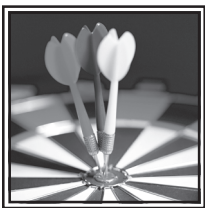
- ♦ Established a nationwide commitment to prevention and protection
- ♦ All source water assessments should have been completed by May 2003

Overhead I-10



In 1996, amendments to the Safe Drinking Water Act were adopted by Congress. The amendments reflected the nation's commitment to maintaining drinking water quality and preventing drinking water contamination before it occurs. The amendments required states to develop state-wide source water assessment programs, which were then approved by the USEPA. The amendments also required that source water assessments be completed for all public water systems by 2003.

Citizens can become involved now by doing what you are doing - learning about their source water assessment and strategies they may use to protect their source water. By gaining a valuable understanding about local source water resources, citizens will be better prepared to become involved and take action to protect their drinking water source!



Major Point to Remember

All source water assessments should have been completed by May 2003. Check with your state drinking water agency or local drinking water provider to find out if an assessment has been completed for your drinking water source.



A state environmental protection agency representative or public water supplier are excellent resources and often can give the group some perspective as to what has been done in their state and community to assess and protect their sources of drinking water.

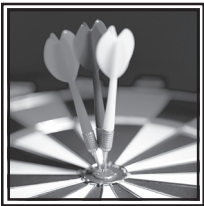
Clean Water Act (CWA)

Regulates pollutant discharges from point sources, primarily through National Pollutant Discharge Elimination System (NPDES) permits.

Controls non-point source pollution for impaired waters by developing Total Maximum Daily Loads (TMDLs).

Overhead 1-11

The Clean Water Act (CWA) serves to protect sources of drinking water by regulating discharges of pollutants into the waters of the United States. The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The CWA gave USEPA the authority to set effluent (i.e. liquid discharged as waste) standards on an industry basis and continued the requirements to set water quality standards for all contaminants in surface waters. The CWA has been reauthorized and added amendments in 1977 to focus on toxic pollutants and in 1987 to focus on toxic substances, citizen law suit provisions, and construction of sewage treatment plants.



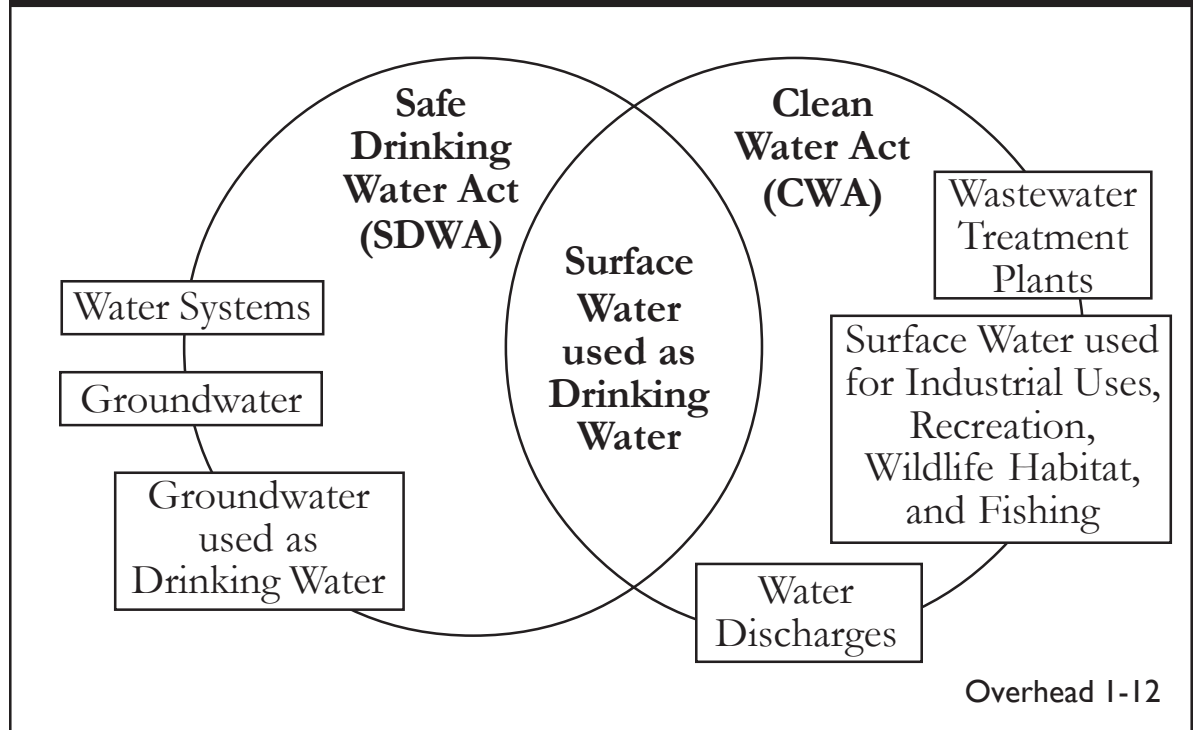
Major Point to Remember

The CWA makes it unlawful for any person to discharge any pollutant from a point source (i.e. pipes, outlets, or other conveyances) into navigable waters unless a National Pollutant Discharge Elimination System permit (NPDES permit) is obtained under the Act. Permits are not required, however, for nonpoint sources, which are pollutants diffused across a broad area so their contamination cannot be traced to a single discharge point. Examples of nonpoint source pollution include runoff of excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas; oil, grease, and toxic chemicals from urban runoff and energy production; and sediment from improperly managed construction sites, crop and forest lands, and eroding streambanks.



Under CWA Section 303(d), states are required to identify waters that do not meet water quality standards after the implementation of nationally required levels of pollution control technology, and to develop Total Maximum Daily Loads (TMDLs) for those waters. TMDLs are used to determine the maximum allowable amount of pollutants that can be discharged to impaired waters in a day. Based on this determination, pollutant loadings are allocated among pollution sources in a water segment. TMDLs also provide a basis for identifying and establishing controls to reduce both point and non-point source pollutant loadings. State lists that identify waters needing TMDLs, and TMDLs developed for specific water bodies, are a useful source of information for the development of source water assessments.

SDWA / CWA



The Clean Water Act (CWA) allows the USEPA to delegate many of the permitting, administrative, and enforcement aspects of the law to state governments. In states with the authority to implement CWA programs, USEPA still retains oversight responsibilities. For more information about the CWA, visit www.epa.gov/region5/water/cwa.htm.

The Safe Drinking Water Act (SDWA) and the CWA primarily intersect by addressing the quality of surface water used as drinking water. They may also intersect in those numerous cases where the quality of groundwater has a direct impact on the quality of surface water and vice versa.

For more information about how the SDWA and CWA both protect sources of drinking water, contact USEPA's Safe Drinking Water Hotline at 1-800-426-4791.

Public Involvement: A Continuous Theme

Required in:

- ♦ State assessment program development
- ♦ Making assessments available to the public

Encouraged in:

- ♦ Assessment process (e.g. contaminant source inventory)
- ♦ Development of local protection programs

Overhead I-13

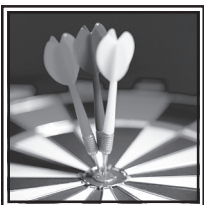


IMPORTANCE OF PUBLIC INVOLVEMENT

Public involvement is critical to source water assessment and protection, and the reason for this is simple. Everyone in a community needs water, uses water, and impacts water. No one is “exempt” from water management - we do it in our households and workplaces every day. How we choose to manage and interact with water, individually and as a community, is vital to maintaining and improving its quality as a source of drinking water.

As part of the 1996 amendments to the Safe Drinking Water Act, public involvement was required as part of the states’ source water assessment program development process and by making source water assessments available to the public. Although it is not a requirement, citizens can also get involved in conducting a community’s source water assessment. Citizen volunteers have been known to be especially useful in identifying potential sources of contamination in the community and adding information to susceptibility analyses. They are “out and about” and can be easily trained to look for certain substances and practices that can be identified as potentially harmful to drinking water sources. Citizens can also be involved in the development of local source water protection programs.

Building teams within communities is an excellent way to create a group of educated and committed citizens who work together to confront drinking water concerns. For more information about teams and team-building, contact The Groundwater Foundation at 1-800-858-4844 or visit www.groundwater.org.



Major Point to Remember

Citizens are critical when it comes to source water protection. When citizens support policies and programs to protect drinking water sources, decision-makers are more likely to implement those policies and programs.



Discussion Point

Are you interested in protecting your community's drinking water source? Why?



Workshop Presenters

All members of a community have something to contribute to the drinking water source assessment and protection process. Throughout this workshop we will recognize how groups and individuals can contribute their knowledge, expertise, and time to the process. Be thinking about how your community contacts could get involved. **Parts Four** through **Six** of this workshop guide focus on existing programs, tools, and organizations that provide assistance to grassroots community groups who want to become involved.

Part Two

SOURCE WATER ASSESSMENT

Goal

To describe the source water assessment process requirements, as per the 1996 Safe Drinking Water Act (SDWA) amendments, United States Environmental Protection Agency (USEPA) guidance, and additional material.

Topic	Material
Obtain a Copy of Your Local Source Water Assessment	Overhead 2-1
Step One: Identify the Drinking Water Source	Overhead 2-2 Handouts 2-1, 2-2, 2-3, 2-4, 2-5, 2-6, 2-7
Step Two: Identify Potential Contamination Sources	Overhead 2-3, 2-4, 2-5 Handout 2-8
Step Three: Determine Susceptibility	Overheads 2-6, 2-7, 2-8
State Source Water Assessment Program	Overhead 2-9
Step Four: Make Assessments Available to the Public	Overhead 2-10, 2-11 Handout 2-9

Suggested Time
60 minutes



Workshop Presenters

Part Two is designed to introduce workshop participants to the specific steps of the source water assessment process required by the 1996 SDWA amendments.

Upon completion of **Part Two**, participants will be able to:

1. Identify the four steps of the source water assessment process required by the 1996 SDWA amendments;
2. Understand the specific requirements of each step of the source water assessment process; and
3. Identify existing resources and partners that may be useful during each step of the source water assessment process.



Optional Training Materials

The handouts for **Part Two** are included to provide workshop participants with a list of items and graphic examples they should look for in their state's source water assessment program and/or local source water assessment. You could hand them out individually as you discuss each step, or all at once as a set.

Obtain a Copy of Your Local Assessment

Source water assessments must be made available to the public - **HOWEVER**, the sensitivity of this information means that availability varies widely.

A basic understanding of the information provided in a source water assessment is **CRITICAL** to source water protection.

Overhead 2-1

While the 1996 amendments to the SDWA require significant new efforts to fully inform citizens about the source, quality, and potential threats to their drinking water, events since September 11, 2001 require that the disclosures of public information provide for the security of those same citizens. Information made available to the public as part of the source water assessment process should definitely take security concerns and potential threats to public water systems into consideration.



Workshop Participants

For individuals and groups interested in getting active in source water protection, an understanding of the information provided in the source water assessment is critical to their success. Make every effort to obtain a complete copy of your local source water assessment, but also respect local government's concerns about safety and security if a copy of the assessment is not all that easy to obtain.



Workshop Presenters

State and/or location-specific information is very important for **Part Two**. You should have at least one copy of your state's source water assessment program or, if it is available, a copy of your local source water assessment on hand to show to your workshop's participants. You may even want to provide each participant with a copy of your state's assessment program or your local source water assessment. Always be sure to take security concerns into consideration when making copies of local source water assessments.

Step 1: Identify the Drinking Water Source

Groundwater

- ♦ Arbitrary fixed radius method
- ♦ Calculated fixed radius method
- ♦ Analytical method (computer modeling)

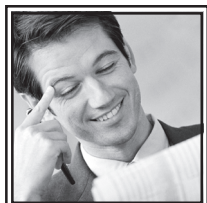
Surface Water

- ♦ Fixed distance delineation method
- ♦ Time-of-Travel delineation method

Groundwater and Surface Water

Overhead 2-2

SOURCE WATER ASSESSMENT PROCESS **STEP ONE: Identify the Drinking Water Source**



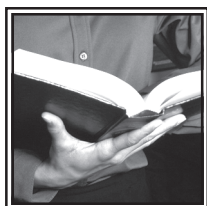
Workshop Presenters

The following material is intended to make workshop participants more aware of the different delineation methods available and the data used in them. Focus on gaining an understanding of the delineation methods that are most likely to be conducted in your area or those described in your state's source water assessment program. Provide examples of the delineation methods used by your state source water assessment program or, if they are available, actual delineations of the source water area(s) of the participants' public water system(s) in lieu of the examples on the handouts.



Workshop Participants

Gaining an understanding of where your source water comes from is the first step toward protecting that resource. Identifying zones within a source water area may be used to target protection activities to those areas that have a more immediate impact on the source water.



Optional Training Materials

Provide copies of **Handouts 2-1 through 2-7** showing Sample Delineation Methods for all participants. You may also use examples from your state's source water assessment program or local source water assessments.



GROUNDWATER

Where groundwater is the source of drinking water, the assessment must identify, or delineate, the wellhead area and other relevant areas where surface water percolates through the ground and replenishes groundwater (i.e. recharge areas), even if they are not directly adjacent to the well.

To delineate a groundwater source of drinking water, concentric circles may be drawn around a well to give people an idea of where contamination would be most likely to reach the well. This delineation method, called the **arbitrary fixed radius method**, is fast, inexpensive, and requires little technical expertise; however, because it does not consider physical/geological features or groundwater movement, it is more like an estimate of where the recharge area is, rather than an exact delineation. See **Handout 2-1: Sample Arbitrary Fixed Radius Delineation**.

A more precise delineation method, the **calculated fixed radius method**, considers groundwater flow, soil conditions, geology, and the physical processes of contamination. The calculated fixed radius method identifies “time-of-travel” zones to represent the amount of time it would take for a contaminant to reach the well if pumping stayed at current levels. Where time, money, and technical expertise is limited, the calculated fixed radius method may be used as an effective starting point for source water protection efforts. See **Handout 2-2: Sample Calculated Fixed Radius Delineation**.

A more precise delineation method uses computer models and a variety of data points (e.g. aquifer thickness, water table gradient, groundwater direction of travel) to delineate the source of drinking water. These **analytical method delineations** are more expensive, but not prohibitively so, and should be conducted by a qualified professional. State environmental protection agency personnel, Rural Water Association technicians, conservation district personnel, private consultants and/or U.S. Geological Survey professionals are generally among those qualified to delineate a drinking water source using computer models. See **Handout 2-3: Sample Analytical Method Delineation**.

Using different delineation methods significantly impacts how a groundwater recharge area will appear on a community’s assessment map. In some cases, a recharge area may first be delineated using the fixed radius method, and then delineated using an analytical method. It is very important that the difference between the two methods be clearly understood, especially when the differences have a significant impact on how protection area boundaries are determined. See **Handout 2-4: Groundwater Delineation Method Comparison**.



SURFACE WATER

Where surface water is the source of drinking water, the assessment should delineate the entire surface water area above where water is withdrawn or diverted to the public water supply system.

Surface water areas, or watersheds, may be delineated relatively easily by using a topographic map to identify drainage channels and runoff patterns upstream of the drinking water intake. Watershed boundaries may then be identified by locating the divides between drainage basins. Specific conditions that influence the movement of surface water within the watershed should be identified by a qualified professional, such as those mentioned earlier.

While the entire watershed upstream of a drinking water system intake needs to be delineated up to the state's borders, a state can identify areas within the watershed as being more critical to protecting the water supply. To give people a general idea of where runoff is most likely to reach a surface water source, a **fixed distance delineation method** may be used. This is similar to the arbitrary fixed radius method in that it is relatively easy to do. See **Handout 2-5: Sample Fixed Distance Delineation Method**.

Surface water delineations can also be done in a way that identifies time-of-travel zones. Stream flow data is needed to determine the time-of-travel zones for this delineation method. See **Handout 2-6: Sample Time-of-Travel Delineation Method**.

GROUNDWATER AND SURFACE WATER COMBINED

Where groundwater and surface water both serve as a community's source of drinking water or where groundwater is under the direct influence of surface water or vice versa, special relationships must be recognized and a comprehensive assessment of all sources conducted. See **Handout 2-7: Sample Conjunctive Delineation**.

BOUNDARY LINES

Often sources of drinking water encompass a variety of political jurisdictions. When recharge areas and watersheds include more than one state, county, or city, governments must work together to assess and protect the drinking water source. Multi-state agreements or nonprofit organizations can be used to coordinate and implement multi-jurisdictional assessment and protection programs.



Workshop Presenters

Remember that this is a brief overview of what in some cases may be a very complicated, technical process. For more information about delineation methods, contact your state drinking water agency or visit *Delineation Tools* at www.epa.gov/safewater/protect/delineation.html.



Discussion Point

Does anyone have questions about the delineation examples or the delineation method used to identify their source water area(s)?

Step 2: Identify Potential Contamination Sources

Assessments must identify sources of:

- ♦ Contaminants with a USEPA-established maximum contaminant level (MCL)
- ♦ The microorganism *Cryptosporidium*
- ♦ Contaminants regulated under the Surface Water Treatment Rule

States may also identify additional sources of contaminants, such as sources of currently unregulated viruses, that may be regulated in the future.



Overhead 2-3

STEP TWO: Identify Potential Contamination Sources

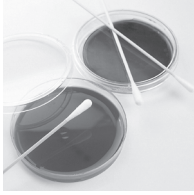
A source water assessment is required to identify all significant potential sources of contamination by regulated contaminants. Significant potential sources include:

- ♦ Contaminants with a USEPA-established maximum contaminant level (MCL),
- ♦ Sources of the microorganism *Cryptosporidium*, and
- ♦ Sources of contaminants regulated under the federal Surface Water Treatment Rule.

MCLs are the highest limits allowed of particular substances in public water supplies. To obtain a list of contaminants with a USEPA-established MCL, contact USEPA's Safe Drinking Water Hotline at 1-800-426-4791 or visit www.epa.gov/ogwdw. Individual states may add other potential contaminants to this list. For more information about the listed contaminants in your state, contact your state drinking water agency.

Cryptosporidium is a microbial pathogen that is resistant to traditional drinking water disinfection practices. In 1993, *Cryptosporidium* caused 400,000 people in Milwaukee to experience intestinal illness. For more information about *Cryptosporidium* and its potentially severe impacts on persons with severely weakened immune systems, contact USEPA's Safe Drinking Water Hotline at 1-800-426-4791 or visit www.epa.gov/safewater/crypto.html.

The purpose of the Surface Water Treatment Rule is to prevent waterborne diseases caused by viruses like *Legionella* and *Giardia lamblia*. These disease-causing microbes are present at varying concentrations in most surface waters. The rule requires water systems to filter and disinfect water from surface water sources to reduce the occurrence of unsafe levels of these microbes.



USEPA encourages states to inventory additional sources of contaminants that are not federally regulated at present but will be in the future. Those additional sources of contamination include pathogenic viruses and bacteria which will be addressed under the federal Ground Water Rule.

The Ground Water Rule will require public water systems to provide drinking water free from all fecal contamination, including e-coli bacteria. Public water systems may find that disinfection is the most cost efficient method for meeting this requirement, however, states may allow public water systems to comply with the Ground Water Rule through specific source water protection and infrastructure practices, such as a fully implemented wellhead protection program, regular sanitary surveys and cross-connection controls.

Step 2: Identify Potential Contamination Sources

Methods to Identify Potential Sources of Contaminants:

- ♦ Database Search
- ♦ Windshield Survey
- ♦ Site Visits with One-on-One Interviews



Clearly should focus on known sources of contamination and problem areas.

Overhead 2-4

Contaminant source inventories may start with a **search of existing databases** to identify the type and quantity of potential contaminants that have been documented to exist in the delineated source water area. In many cases, those databases exist as part of a federal program to monitor and manage volatile or hazardous substances (refer to **Part One** of this workshop guide). These programs include, but are not limited to, the following:

- ♦ National Pollutant Discharge Elimination System (NPDES)
- ♦ Resource Conservation Recovery Act (RCRA)
- ♦ Superfund Comprehensive Emergency Response Cleanup and Liability Act (CERCLA)
- ♦ Superfund Amendments and Reauthorization Act Title III (SARA Title III)
- ♦ Underground Injection Control

The state agencies responsible for collecting and updating these databases vary from state to state. In general, the following state agencies and/or departments could provide valuable contaminant source inventory information:

- ♦ State environmental protection agency
- ♦ State health department
- ♦ State fire marshal
- ♦ State agriculture department
- ♦ State agencies that manage natural resources, such as oil and gas, water, soil, etc.

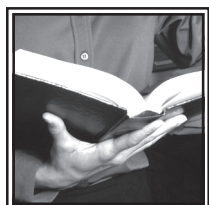
The entity responsible for conducting the state database searches will also vary from state to state.

To verify and update the database search, the contaminant source inventory should be ground-truthed. A simple way to ground-truth the contaminant source inventory is to conduct a **windshield survey** by driving or walking around the source water area and recording all the potential contaminants that are seen there. A more comprehensive method includes making a site visit to any facility or area that may use or produce contaminants of concern. Here citizens are encouraged to get involved as volunteers to conduct the interviews and record the information from **site visits**. For larger areas, such as entire watersheds, the on-site inventory can concentrate on known areas of concern first and then become more detailed. See **Handout 2-8: Contaminant Source Inventory Data Sheet** for a sample form used to record information during a contaminant source inventory site visit.

The following potential pollutant sources should be identified in a contaminant source inventory*:

- ◆ Sewage Disposal - Wastewater discharges (municipal, industrial), wastewater collection systems (pump stations, collection system), on-site sewage disposal (septic tanks/drain fields)
- ◆ Urban Runoff - Combined sewer overflows, landfills, land development
- ◆ Industrial Runoff - Permitted discharges, accidents and spills
- ◆ Animal Population - Feed lots, dairies, grazing
- ◆ Agricultural Runoff - Manure, sludge application, pesticide/herbicide application, soil disturbance and runoff
- ◆ Forestry, Soil Disturbance Runoff - Logging impact, forest fires
- ◆ Recreation - Body contact recreation, non-body contact recreation (camping, equestrian, off-road vehicles, etc.), waste disposal relating to boating and fishing
- ◆ Mine Runoff
- ◆ Solid and Hazardous Waste Disposal and Storage Facilities
- ◆ Traffic Accidents/Spills
- ◆ Saltwater Intrusion (a concern for systems in coastal zones)

*This list does not include all of the various potential pollutant sources that may be found in a community. For more information about potential sources of contamination, contact your state environmental protection agency and/or your local health department. They may be able to provide you with a list of contaminants generally found in your area.



Optional Training Materials

Provide copies of **Handout 2-8: Contaminant Source Inventory Data Sheet**.

Step 2: Identify Potential Contamination Sources

Using Technology to Identify Potential Contamination Sources:

- ♦ Information Technology is Generally Available - You Just Have to Ask
- ♦ Information Technology is Relatively Cheap
- ♦ Volunteers Can Learn How to Collect Data Fairly Quickly - Someone with GIS Experience is Needed to Compile and Manage the Data
- ♦ Public Education is the Key to Success



Overhead 2-5

Conducting a contaminant source inventory can be as simple as walking through a well-head protection area and making note of potential contaminants on a notepad, or as technically sophisticated as georeferencing sites of potential contaminant sources in a Global Positioning System (GPS) receiver and later exporting them into a Geographic Information System (GIS). The amount of technology used is dependent upon the availability and affordability of equipment and software to the user. A community's use of technology will also depend upon how the community intends to analyze and use the data collected in a contaminant source inventory, notify the public of the information derived from the inventory, and update and maintain the inventory in the future.



In 2002 The Groundwater Foundation conducted the Applying Community Technology Today (ACTT) project to identify and test technologies that could be useful to small communities interested in minimizing drinking water threats. A primer, *Using Technology to Conduct a Contaminant Source Inventory: A Primer for Small Communities*, reviews the technologies tested and offers lessons learned during the project. To obtain a copy of the primer, contact The Groundwater Foundation at 1-800-858-4844 or visit www.groundwater.org/pe/actt/actt.html. A summary of the lessons learned from the project are:

- ♦ **Information technology is generally available—you just have to ask to use it:** A small community may borrow the technology to conduct a contaminant source inventory from a variety of local partners, including other local or county government agencies, universities, or nonprofit organizations. Often this technology is readily available, but is not being used to manage information about potential contaminants located in a source water area.

- ♦ **Information technology is relatively cheap:** A small community may purchase the technology to conduct a contaminant source inventory at a relatively low cost, especially if it partners with organizations, such as educational institutions, that receive discounts.
- ♦ **Volunteers can learn how to collect contaminant source inventory data fairly quickly, but someone with GIS experience is needed to compile and manage the data:** Individuals with little or no experience using GPS and GIS can learn to collect contaminant source inventory data in a relatively short time. Someone trained to use GIS will need to compile the data, produce maps and database reports, and manage and update the database as new information becomes available.
- ♦ **Public education is the key to success:** Public education prior to, during, and following a contaminant source inventory is very important. The public should understand why and how an inventory is being conducted, how they can take part in conducting an inventory, and the results of the inventory. The maps produced by GIS are an excellent educational tool and can clearly show the public existing and potential risks to their drinking water source.



Discussion Point

Does anyone use information technology for their “regular job”? Would you recommend using information technologies such as GIS to conduct a contaminant source inventory? Would you be willing to assist your community in putting a ground-truthed contaminant source inventory on GIS?

Step 3: Determine Susceptibility

The Assessment should determine

“The potential for a public water system to draw water contaminated by inventoried sources at concentrations that would pose concern.”

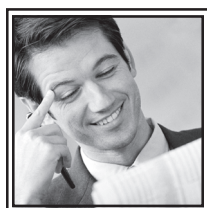
- USEPA Assessment Guidance

Each state must determine the susceptibility of all public water systems in the state.

Overhead 2-6

STEP THREE: Determine Susceptibility

A susceptibility assessment evaluates how vulnerable the public water supply system is to contamination. A susceptibility assessment will assist the community in determining which potential contaminant sources pose the most concern to water quality. At the very least, the assessment should determine the potential for the public water supply to draw water contaminated by inventoried sources at concentrations that would pose concern. With this information, management priorities can be established for a source water protection program.



Workshop participants may have heard about the vulnerability assessments public water systems are conducting to improve water system safety and security. Vulnerability assessments for security are administratively different from the susceptibility assessments conducted as part of a source water assessment; however, similar data may be gathered for each. For more information about vulnerability assessments, visit www.epa.gov/safewater/security.

Step 3: Determine Susceptibility

- ♦ Analyze hydrology and hydrogeology
- ♦ Understand the characteristics of potential contaminants and how they could move to reach the drinking water source
- ♦ Understand the characteristics of storage facilities that contain and land uses that may expose potential contaminants



Overhead 2-7

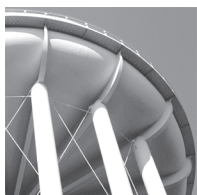
To complete a comprehensive susceptibility assessment, qualified professionals will need to:

- ♦ Analyze the area's hydrology or hydrogeology,
- ♦ Understand the characteristics of potential contaminants and how they could reach the drinking water source,
- ♦ Understand the characteristics of storage facilities and other sources that contain or could release potential contaminants,
- ♦ Evaluate the effectiveness of existing prevention and clean-up programs, and
- ♦ Assess the integrity of groundwater wells and surface water intakes.

Each state will need to come up with its own precise definition of susceptibility to use in their assessment program. A susceptibility assessment should help the community determine which potential contamination sources are priority concerns for the water system and therefore priorities for management in a source water protection program.

Step 3: Determine Susceptibility

- ♦ Evaluate the effectiveness of existing pollution prevention and clean-up programs



- ♦ Assess the strength and stability of the public water system by determining the integrity of wells and intakes

Overhead 2-8

Ideally, contaminants could be ranked to clearly identify potentially high risk contaminants and facilities that need to be targeted for management right away. Such potentially high risk contaminant sources include underground storage tanks and waste disposal sites, which are often already under some type of monitoring program. Medium and low level threats, such as seasonal run-off and recreation waste, will still need to be addressed, but perhaps after the high level threats.



Workshop Presenters

Provide information from your local source water assessment about the susceptibility of your local source water. If location specific information is not available, use information from your state's source water assessment plan to describe how susceptibility is determined in your particular state. Provide participants with examples of susceptibility determinations or copies of the formulas/process used to make a susceptibility determination.



Discussion Point

Does the source water assessment verify what you already know about your source water (i.e. that your source water is susceptible to nitrate contamination)? Are you relieved or concerned about your source water area's susceptibility determination?

State Source Water Assessment Program

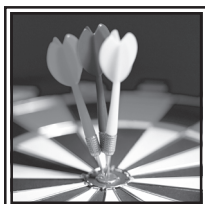
Purpose:

Generate assessments detailed enough to develop source water protection programs.

Overhead 2-9

HOW GOOD DO THE ASSESSMENTS HAVE TO BE?

The assessments prepared by the states should be good enough to lead to the protection of drinking water sources. Source water assessments in general and susceptibility assessments in particular should be made easy for citizens and decision-makers to use and understand, yet detailed enough to be valuable to those needing information to protect sources of drinking water in their community. Ideally the assessments should be linked to existing or future wellhead and watershed protection programs.



Major Point to Remember

Communities should double-check the information provided in a source water assessment before they begin developing a source water protection program.



Workshop Presenters

If you were able to obtain a copy of your state-produced source water assessment, ask the workshop participants how accurate they think it is. Would they like to have additional information? Talk briefly about how additional information may be obtained. Information about assistance providers is provided in **Part Six** of this workshop guide.

Step 4: Make Available to the Public

- ♦ Consumer Confidence Reports (published annually)
- ♦ Water Bill Stuffers
- ♦ Public Meetings
- ♦ Traditional Media Outlets - press releases, newspaper articles, news conferences, public service announcements, radio, television, news, posters, flyers, brochures



Overhead 2-10

STEP FOUR: Make Source Water Assessments Available to the Public

The 1996 SDWA amendments require that easy-to-understand source water assessments be made available to the public in a timely manner to fully inform citizens about the source, quality, and potential threats to their drinking water source. However, in light of the events of September 11, 2001, federal, state and local governments must make sure that the disclosure of this information also provides for the security of those same citizens.

The most obvious entity who should be responsible for making the assessments available to the public is the entity who conducted the assessment. If the entity is a state agency, it should cooperate with a local entity to “get the word out.”

In most cases, the most likely local entity to make the assessment available to the public is the local public water supplier. Public water suppliers are already required to distribute a consumer confidence report to all their customers on an annual basis. A summary of the system’s source water assessment must be included in the consumer confidence report. This summary must include the source and general location of a system’s water supply. For a surface water system, naming the water body where the intake is located would suffice. For a groundwater system, naming the principle aquifer from which the source water was drawn would suffice. Systems serving 100,000 or more persons must maintain a current consumer confidence report on a website.

Step 4: Make Available to the Public

“Up and Coming” Media Outlets

- ♦ Cable access television
- ♦ Websites

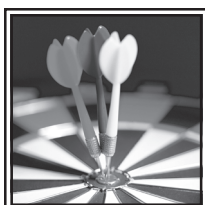
Educational Events - Festivals and Fairs

- ♦ National Drinking Water Week

Overhead 2-11

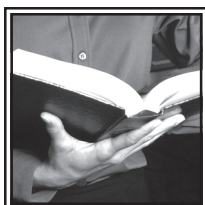
USEPA goes on to suggest that public water suppliers publicize the availability of the assessment reports, send the results to all customers in bill stuffers, and include more detailed information as part of their annual consumer confidence reports. Public water suppliers are also encouraged to conduct additional outreach and education efforts.

Although consumer confidence reports are the logical first choice, source water assessments should be publicized through additional outlets such as water bills, press releases, public meetings, newsletters, cable access television, posters, flyers, and the Internet.



Major Point to Remember

Ideally, a community’s source water assessment publicity effort will be part of a comprehensive public education and outreach effort, sponsored by a team of community representatives.

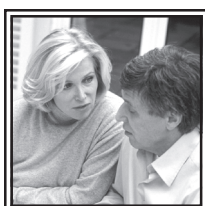


Optional Training Materials

For a copy of a USEPA memorandum on Sensitive Data in Consumer Confidence Reports and Source Water Assessments, visit www.epa.gov/safewater/protect/sensitivedwdata.html.

Some workshop participants may be interested in learning more about working with the media to gain attention for their Source Water Assessment and Protection Efforts.

Handout 2-9 offers a variety of tips and strategies for effectively Working With the Media.



Discussion Point

What public information methods work best for your community? Think of these methods when discussing source water protection strategies in **Part Three**.

Part Three

SOURCE WATER PROTECTION

Goal

To define and provide an overview of the two major components of source water protection - contaminant source management and contingency planning.

Topic	Material
Source Water Protection is....	Overhead 3-1
Source Water Protection safeguards....	Overhead 3-2
Costs of Source Water Contamination	Overhead 3-3
Costs of Source Water Protection	Overhead 3-4
Contaminant Source Management	Overhead 3-5
Regulatory Strategies	Overhead 3-6, 3-7, 3-8
Voluntary Strategies	Overhead 3-9, 3-10, 3-11
Non-Structural Strategies	Overhead 3-12
Structural Strategies	Overhead 3-13, 3-14
Source Water Protection - What Works Best	Overhead 3-15
Contingency Planning	Overhead 3-16, 3-17, 3-18
Source Water Protection	Overhead 3-19
Groundwater Guardian	Overhead 3-20

Suggested Time
60 minutes



Workshop Presenters

Part Three is designed to give workshop participants an overview of specific strategies in source water protection.

Upon completion of this chapter, participants will be able to:

1. Identify the benefits of source water protection;
2. Define contaminant source management and recognize it as a component of source water protection;
3. Recognize basic methods of contaminant source management, some of which may currently be used in their community;
4. Define methods of contingency planning and recognize it as a component of source water protection; and
5. Recognize basic methods of contingency planning, some of which may currently be available in their community.

Source Water Protection is...



Contaminant Source Management

- ♦ Keeping Potential Contaminants Away from a Drinking Water Source

Contingency Planning

- ♦ Establishing a Plan of Action in Case of an Emergency

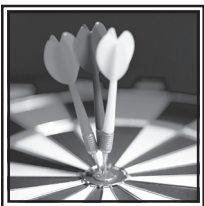
Overhead 3-1

BASICS OF SOURCE WATER PROTECTION

Sources of drinking water are generally protected through two major components, both of which are equally important to protecting the resource. The two major components of source water protection are contaminant source management and contingency planning.

Contaminant source management involves a community adopting strategies, programs, and laws to keep potential contaminants away from a drinking water source. Contaminant source management strategies can be voluntary, regulatory, structural, and/or non-structural.

Contingency planning is used to develop community-based alternative action plans for drinking water emergencies, contamination events, or water system failure. Contingency planning also includes planning for new or additional sources of drinking water to accommodate population growth and increases in demand.



Major Point to Remember

To truly protect a community's source of drinking water, contaminant source management plans and contingency plans should both be in place.

As with source water assessment, the primary goal of efforts to protect sources of drinking water is to provide the community, now and in the future, with an adequate supply of high-quality drinking water.

A community embarking on the development of a source water protection program should further refine their goals to include specific, measurable, and achievable objectives. These objectives could include measures to:

- ♦ Minimize impervious areas (paved surfaces or rooftops) to preserve groundwater recharge and source water protection areas
- ♦ Provide an equitable sharing of the costs and benefits of protecting water supplies
- ♦ Protect water supplies from adverse effects of urbanization
- ♦ Preserve open-space land for aesthetics and recreation while also preserving land for water supply protection

Often plans to protect drinking water sources can be developed to correspond to and support programs, policies and goals already established within the community, such as those outlined in comprehensive plans, economic development plans, transportation plans, and recreation plans. These protection plans have a greater likelihood of gaining support than those that do not take into consideration existing plans.



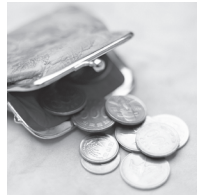
Protection of drinking water sources is an extension of the government's police power, included under the government's power to protect public health, safety, and general welfare. The state delegates this power to local governments through enabling legislation. To protect groundwater at the local level, communities need to:

1. Identify whose responsibility it is to protect sources of drinking water,
2. Get the public involved, and
3. Base delineations and protection plans on sound science.

Mandatory programs developed to protect sources of drinking water must clearly focus on the areas of greatest importance.

Source Water Protection safeguards...

Public Health - by reducing risks of both acute and chronic ailments



Economic Well-being of Communities - because less polluted water is less expensive to treat

Overhead 3-2

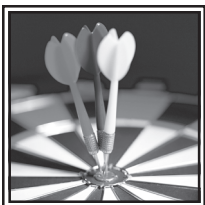
Source water protection is in the best interest of all people because it safeguards both the public health and economic well-being of communities.

Source water protection benefits public health because preventing the contamination of drinking water supplies should result in reduced risk to human health from both acute (i.e. rapid onset) and chronic (i.e. long term) ailments. Although most people experience only mild illnesses from waterborne microbes, pathogenic organisms such as *Cryptosporidium* and some strains of *E. coli* can be transmitted to people through drinking water and cause serious illness or even death.



In addition to threats posed by microbial contaminants, other substances can contaminate water supplies. Metals, volatile organic carbons, synthetic organic chemicals, and pesticides can cause serious health problems for persons exposed to them over long periods of time at levels exceeding health-based drinking water standards. Potential health effects of long-term exposure to these pollutants include cancer, birth defects, and organ, nervous system, and blood damage.

Source water protection benefits the economic well-being of communities because less polluted water is less expensive to treat.



Major Point to Remember

Studies have shown that the cost of dealing with contaminated groundwater supplies for the communities studied is, on average, 30 to 40 times more (and up to 200 times greater) than preventing their contamination.

Costs of Source Water Contamination

Quantifiable Costs - treatment and remediation, finding and replacing water supplies, public information campaigns, regulatory compliance, loss of property value and tax revenue

Other Less Quantifiable Costs - health costs, lost productivity, lost economic development opportunities, lost consumer confidence

Overhead 3-3



The benefits to communities of protecting their drinking water supplies might best be understood by describing the costs of failing to protect them. These costs include those that are relatively easy to capture in monetary or economic terms and those that are not.

Easily quantifiable costs of drinking water supply contamination include:

- ◆ Treatment and remediation;
- ◆ Finding and developing new supplies and providing emergency replacement water;
- ◆ Abandoning a drinking water supply due to contamination;
- ◆ Paying for consulting services and staff time;
- ◆ Litigating against responsible parties;
- ◆ Conducting public information campaigns when incidents arouse public and media interest in source water pollution;
- ◆ Meeting the regulations of the Safe Drinking Water Act, such as the disinfection byproduct and monitoring requirements; and
- ◆ Loss of property value or tax revenue.

Costs that are not easily quantified include:

- ◆ Health related costs from exposure to contaminated water;
- ◆ Lost production of individuals and businesses, interruption of fire protection, loss of economic development opportunities; and
- ◆ Lack of community acceptance of treated drinking water.



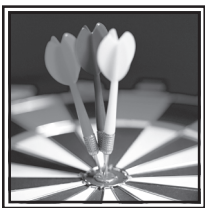
Include a state or location specific case study example to show that treatment can cost a community much more than protection would have. Use case studies that feature contaminants that are common in your area and have had a massive impact on source water resources (e.g. nitrate in the midwest; MTBE in California) or examples of potential sources of contamination that are common in your area but not yet well known for having a massive impact (e.g. abandoned wells). See **Part Four** of this workshop guide for more information about how to locate additional source water protection case studies.

Costs of Source Water Protection

Vary widely from community to community - basically the costs of source water protection are up to you!

Overhead 3-4

The cost to an individual supplier or community greatly depends on the types of source water protection strategies it chooses to implement. Source water protection strategies can be relatively simple and inexpensive (such as public education programs) or expensive (such as purchasing land or easements). Program costs include staffing; program planning, development, and administration; land or easement purchases; and structural management measures. For example, constructed management devices such as wetlands and retention basins can cost approximately \$100,000 for a 50-acre site, plus the value of the land they occupy. Housekeeping measures (i.e. street sweeping) cost public works departments various amounts depending on the frequency at which they are performed.



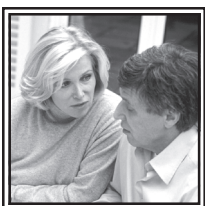
Major Point to Remember

These costs may vary greatly from community to community and place to place, and will depend on such factors as the value of real estate in a particular area and the measures the community selects to protect its water supplies.

The United States Environmental Protection Agency (USEPA) studied the contamination and prevention costs to six small- and medium-sized communities that experienced contamination of their groundwater supplies and subsequently developed a wellhead protection program. The study showed that:

- ♦ Costs of source water contamination included costs of remediation activities, replacing water supplies, and providing water.
- ♦ Protection costs include basic program costs for delineating a protection area, identifying potential sources of contamination, developing an initial management plan, and planning for alternative water supplies and other responses in case of an emergency. (Much of this work should have been completed as part of the source water assessment.)
- ♦ The ratio of the benefits of avoiding contamination to the costs of the wellhead protection programs ranged from 5 to 1 to 200 to 1.

Comparing the costs of contamination to the costs of protection reveals that protection programs are generally well worth the cost and effort as an effective “insurance” against contamination and its associated costs. If you add the considerable quality of life benefits that are potentially provided by a source water protection program, the program may prove to be a bargain.



Discussion Point

How much do you think your community would be willing to invest in source water protection?

Contaminant Source Management

	Regulatory	Voluntary
Structural	Regulation of Underground Storage Tanks	Buffer Strips
Non-Structural	Consumer Confidence Reports	Volunteer Monitoring

Overhead 3-5

SOURCE WATER PROTECTION THROUGH CONTAMINANT SOURCE MANAGEMENT

Contaminant source management is made up of strategies to keep potential contaminants physically away from the drinking water source. The goal is to prevent contamination before it occurs and maintain the quality of the drinking water source.

Contaminant source management, by its very nature, especially as it relates to groundwater, is a locally sensitive project. The complex interface of such factors as soil type, water table levels, geology/hydrogeology, existing land uses, and local priorities means that management strategy goals will vary from community to community.

In general, contaminant source management strategies can be described as regulatory - required by law, or voluntary - not required by law, but often encouraged through financial incentives and education programs. Strategies can also be described as structural - built structures or devices that control or contain contaminants, or non-structural - programs, policies and procedures that educate and/or guide individual or group activities that have an impact on water and drinking water quality.



Tip for Workshop Presenters

This workshop describes, in a general way, the expected benefits from implementing regulatory, voluntary, structural, and non-structural contaminant source management strategies. Specific case studies and technical information supporting these strategy descriptions are available as part of the Groundwater Guardian Community Profiles on The Groundwater Foundation's website at www.groundwater.org. See **Part Four** of this workshop guide for more information about how to locate additional source water protection case studies.

Regulatory Strategies

Zoning - directs future development

Overlay Zoning Districts - take a zoned area and add another layer of zoning regulations to it

Overhead 3-6



REGULATORY CONTAMINANT SOURCE MANAGEMENT STRATEGIES

Regulatory contaminant source management strategies require local and state governments to develop policies and programs and pass legislation to protect drinking water sources and other natural resources. Local governments generally protect groundwater and surface water sources of drinking water from contamination by using a variety of tools, such as zoning, health regulations, subdivision controls, and transfer of development rights. The ordinances, regulations and bylaws associated with these tools are being used to regulate on-site wastewater treatment systems; to place limitations on the use of toxic and hazardous materials, pesticides, and salts; to limit nitrogen loading within wellhead protection areas; and to prohibit certain uses within wellhead protection areas, such as landfills and underground fuel storage tanks.

ZONING

All states have zoning enabling legislation, although not all legal subdivisions (counties, cities) have approved zoning ordinances. For example, counties in Nebraska have historically opted not to adopt zoning ordinances. Today this situation has changed, with most Nebraska counties now adopting zoning ordinances to regulate the construction of confined animal feeding operations.

Zoning as a tool is most useful in directing future development. Zoning is not useful in changing current and existing development. Pre-existing land uses are generally grandfathered or exempt from regulation unless changes in land use are proposed.

OVERLAY ZONING DISTRICTS

Overlay zoning districts take an area that is already zoned and add another layer of zoning regulations to that specific land area. To create an overlay zoning district for source water protection, a scientifically sound delineation of the source water protection area must be conducted. Each district's regulations may be tailored to minimize the contamination potential of certain known contaminants in the area.

Regulatory Strategies

Overlay Zoning Districts may utilize:

- ♦ Land use controls
- ♦ Subdivision regulations
- ♦ Special permitting
- ♦ Performance standards (construction and operating standards)
- ♦ Growth controls



Overhead 3-7

Overlay Zoning Districts may utilize:

- ♦ **Land Use Controls** - Land use controls may be used to target activities that use dangerous substances or that target the substances themselves. Some examples of substance-specific land use controls are prohibiting gas stations in sensitive areas, requiring double-hulled or corrosion-resistant underground storage tanks in sensitive areas, requiring minimum setbacks for on-site wastewater treatment systems, or requiring regular maintenance and inspection of on-site wastewater treatment systems.
- ♦ **Subdivision Regulations** - Subdivision regulations govern the process by which individual lots of land are created out of larger tracts and are intended to ensure that subdivisions are appropriately related to their surroundings. Some examples of subdivision regulations are those that govern the siting of on-site wastewater treatment systems and storm water infiltration structures to ensure they do not contaminate groundwater and protect aquifer recharge areas and manage drainage (e.g. using erosion control structures) to ensure that runoff does not become excessive as the area of paved surfaces increases.
- ♦ **Special Permitting** - Special permitting may be used to restrict uses within certain areas where they may cause contamination if left unregulated. Regulations ensure that extra attention is paid to the property. When certain precautions are taken, these particular uses should not pose a threat to the water supply.
- ♦ **Performance Standards** - Performance standards may be used to establish a threshold beyond which the impact of a use or activity is unacceptable. The threshold must be scientifically sound and set a standard to limit the impact of allowable land uses. Monitoring and enforcement are necessary to ensure the standards are met consistently over time. TMDLs (total maximum daily loads) are an example of a performance standard used to monitor surface water quality. Regular on-site wastewater treatment system inspection and maintenance and leak detection systems for underground storage tanks are examples of performance standards used to safeguard and monitor groundwater quality.
- ♦ **Growth Controls** - Growth controls time the occurrence of development by enforcing predetermined standards for water quality. The level to which development can maintain an established level of water quality dictates development.



Workshop Presenters

There is no reason to create a zoning ordinance from scratch. For examples of a Ground Water Protection Overlay District Ordinance and a Model Surface Water Ordinance, visit www.epa.gov/nps/ordinance/mol7.htm. Additional ordinances and supporting materials are available at www.epa.gov/owow/nps/ordinance/osm7.htm.

Also contact your state drinking water agency and/or local source water protection professionals for state, regional, and local examples or model examples of source water protection ordinances. If you know of a community that has adopted a groundwater or watershed protection ordinance, contact them and ask them for a copy. They may also be willing to share lessons learned as they developed and adopted the ordinance.

Regulatory Strategies

- ♦ Health Regulations
- ♦ Permitting
- ♦ Inspections
- ♦ Stormwater Management

Overhead 3-8

HEALTH REGULATIONS, INSPECTIONS, AND PERMITTING

Generally health regulations are administered by local health departments and concentrate on specific contaminant sources to reduce their impact on public health. Health regulations often are used to regulate underground storage tanks, on-site wastewater treatment systems, and floor drains. Health regulations are largely seen as a common sense approach to contaminant source management and therefore, are more acceptable to local governments; however, the costs of administering health regulations may be a concern for them.

Municipalities may require owners or operators of facilities that may pose a threat to source water to obtain permits to operate. Permits allow authorities to maintain an inventory of potential contaminant sources, periodically inspect facilities for compliance with ordinances, and require minimum construction or operating standards. Permitting may even be used to monitor the growth of potentially hazardous activities and their impact in a protected area. Permitting fees can help recover the costs associated with tracking and maintaining source-specific information.

Inspections may be used to regularly monitor known uses of potential contaminants to make sure they are being managed properly. Inspections can be conducted for critical watershed and recharge areas, septic system upgrades, and the handling of toxic and hazardous materials.



For some municipalities stormwater runoff may be a potential source of contamination. Large municipalities (i.e. with populations over 100,000), large public complexes, and highway agencies are required to get a National Pollution Discharge Elimination System (NPDES) permit and develop stormwater plans and programs to manage stormwater runoff. For more information about the federal stormwater regulations, visit www.epa.gov/npdes/stormwater/swphases.cfm. For more information about the contaminant source management strategies that may be included in stormwater management plans, refer to the Association of New Jersey Environmental Commission's resource paper, *Municipal Options for Stormwater Management*, at www.anjec.org/pdfs/stormwtr.pdf.



Workshop Presenters

Some local health departments take a very active role in protecting sources of drinking water. Other local health departments are not currently active, but may become more active if they knew more about source water assessment and protection.

Find out about the source water protection activities being implemented by the health departments in your area and invite health department representatives to attend your workshop. They may be willing to present information about their activities or learn more about what kind of regulations other health departments have adopted. See **Part Four** for information on how to locate case studies of health departments that are involved in source water protection.

For examples of zoning ordinances, health regulations, subdivision controls, and other regulatory strategies to protect sources of drinking water, visit *A Compendium of Wellhead Protection Ordinances* at www.epa.gov/safewater/protect/gwpos/index.htm. This compendium was compiled by USEPA Region V in 1998 and does not necessarily contain current versions of the local ordinances. Nevertheless, the statutory language found through this website may be used to learn more about regulatory strategies to protect groundwater sources of drinking water and draft a groundwater protection ordinance.

Voluntary Strategies

- ♦ Land Acquisition - Donations, Purchase (Market Value Transactions)
- ♦ Conservation Easements
- ♦ Limiting Development - Cluster/Planned Unit Development
- ♦ Comprehensive Planning
- ♦ Written Agreements

Overhead 3-9



VOLUNTARY CONTAMINANT SOURCE MANAGEMENT STRATEGIES

Voluntary contaminant source management strategies provide information, education, and tools to stakeholders to motivate people within a watershed and/or wellhead protection area to voluntarily take actions or change their behavior to protect the drinking water source. These strategies also take advantage of the willingness of landowners to voluntarily manage their land to improve and maintain water quality.

The following are examples of voluntary contaminant source management strategies:

- ♦ Land acquisition provides for the permanent protection of sensitive areas.
- ♦ Donations of land (probably the most attractive method of land acquisition) allow communities to permanently acquire and protect sensitive areas.
- ♦ Purchasing land through market value transactions or bargain sale purchases (charitable transactions that usually involve a tax deduction) allow communities to permanently acquire land but at some monetary cost.
- ♦ Conservation easements may be used to restrict the landowner's use of the property. Conservation easements may be purchased or donated and taxes on the property are generally reduced to reflect the land's limited use.
- ♦ Voluntarily limiting development, through strategies such as cluster and planned unit development, can be used to protect sensitive recharge areas. (See non-structural contaminant source management strategies for more information about cluster development and planned unit development.)
- ♦ Comprehensive planning is a process a community goes through to identify current zoning and determine future land uses throughout the community. Comprehensive plans may include zoning and protection programs for existing and future sources of drinking water.
- ♦ Written agreements between landowners and water suppliers can be used to protect source waters. The most common written agreements are conservation easements that provide landowners with tax benefits or payments in exchange for legal restrictions on their property. Other types of written agreements (e.g. development agreements) can be developed to serve the specific needs of both parties involved.

In some states Drinking Water State Revolving Loan Fund (DWSRF) set-aside funds may be used to acquire land. For more information about how your state uses the DWSRF, visit www.epa.gov/safewater/protect/swfasf.html.

Voluntary Strategies



- ◆ Monitoring
- ◆ Water Conservation
- ◆ Agricultural Best Management Practices (BMPs)
- ◆ Other Land Management Activities

Overhead 3-10

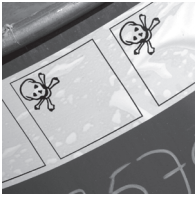
- ◆ Non-regulatory monitoring can be used to measure the effectiveness of protection strategies. Monitoring may show compliance with drinking water standards and detect problems sooner rather than later. Monitoring usually involves regular sampling and testing for contaminants of concern and should be conducted in cooperation with other mandatory monitoring programs. Monitoring may also concentrate on specific areas of concern.
- ◆ Water conservation reduces the volume of water withdrawals and may ensure adequate recharge to an aquifer, protect against saltwater intrusion in coastal areas, and reduce contaminant movement toward a well or intake.
- ◆ Agricultural best management practices (BMPs) may be adopted voluntarily by producers. Often financial incentives are available to encourage producers to install BMPs (e.g. vegetated buffer strips and animal waste control structures.)
- ◆ Other land management activities may be adopted to reduce threats to drinking water sources. Often these environmentally friendly activities benefit ecosystems and the quality of life in communities. Examples of drinking water source-friendly land management activities are planting native vegetation in rural and urban landscapes and using integrated pest management instead of synthetic pesticides.

For a listing of the financial incentives provided by the US Environmental Protection Agency, the US Department of Agriculture, the US Department of the Interior, and other federal government sources, access a copy of *Funding for Source Water Protection Activities* at www.epa.gov/safewater/protect/pdfs/guide_swp_swp_funding_matrix.pdf.

Voluntary Strategies

- ◆ Household Hazardous Waste (HHW) Collection Programs
- ◆ Public Information, Education, and Participation Programs
- ◆ Smart Growth

Overhead 3-11



- ◆ Household hazardous waste (HHW) collection programs can motivate and provide assistance to people so they may properly dispose of several household products which contain hazardous materials. If these HHWs were dumped into sinks and storm drains or on the ground, they could contaminate the drinking water source. Individuals need to be educated about what these wastes are and how they may be properly disposed of. HHW collection days or permanent drop-off locations give people excellent opportunities to dispose of their waste. If incorporated with educational activities, they may also serve as educational opportunities and a great way to get citizens involved in drinking water source protection.
- ◆ Public information, education and participation programs give community members the information, education and opportunity to act responsibly. These kinds of programs can build public support for regulatory programs, when and if regulatory source water protection strategies are necessary. Road signs marking wellhead and watershed protection areas especially grab people's attention.
- ◆ "Smart growth" is a term used to describe the various land use management strategies used to combat urban sprawl. A number of these land use management strategies also may improve water quality and protect source water. For more information about smart growth, refer to *Smart Growth for Clean Water: Helping Communities Address the Water Quality Impacts of Sprawl* at www.nalgep.org/issues/smartgrowth.

Non-Structural Strategies

Land-focused Strategies

Large-lot zoning, Cluster development, Planned Unit Developments (PUDs), Transfer of Development Rights

Home and Business-based Strategies

Overhead 3-12



NON-STRUCTURAL CONTAMINANT SOURCE MANAGEMENT STRATEGIES

Non-structural contaminant source management strategies encourage or require the use of methods and/or techniques that serve to protect source water. Most non-structural contaminant source management strategies focus on the way activities within the source water protection area are done; a few others focus on redirecting activity away from the source water area.

Land use plans may be adopted and other techniques used to concentrate development in less damaging areas so that sensitive areas may be preserved in a more natural state and the quality and quantity of drinking water in the community may be preserved. Non-structural contaminant source management strategies that focus on land use and development include:

- ♦ Large-lot zoning to reduce the impact of residential development by limiting the number of units within the area.
- ♦ Cluster development to allow smaller residential lots to be clustered together. This gives developers the opportunity to preserve more open space and natural areas and reduce the amount of impervious surfaces (paved surfaces and rooftops). This also reduces the developer's costs on utilities, roads and other paving. Cluster development can also be used to preserve natural buffers and groundwater recharge areas.
- ♦ Planned Unit Developments (PUDs) are cluster developments that allow a wider range of land uses, not just residential land use. Comprehensive development of the site allows for a greater amount of flexibility, cooperation and shared land uses. Larger, contiguous open spaces and natural features can also be retained. The built environment may be situated in such a way to minimize the impact on water quality.
- ♦ The Transfer of Development Rights transfer development from within protected areas to locations outside the protected area. This is an effective but administratively expensive and complex zoning tool used for wellhead protection.



A number of non-structural contaminant source management strategies are home and business-based and focus on the wise use and maintenance of materials and machines. Home and business-based non-structural contaminant source management strategies include:

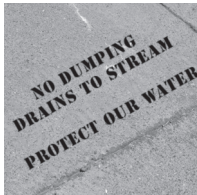
- ◆ Proper use and handling of potentially hazardous materials (e.g. following manufacturer's direction to apply and store pesticides, recycling used oil);
- ◆ Proper use and maintenance of machinery that stores or disperses potentially hazardous materials (e.g. keeping fertilizer equipment properly calibrated, inspecting storage tanks for leaks); and
- ◆ Use of environmentally friendly products (e.g. low sudsing, low phosphate, biodegradable detergents at car washes.)

Structural Strategies

Urban-focused Strategies

Drainage requirements, Storm water ponds, Infiltration basins, Porous pavement, Grassed swales, Constructed wetlands

Overhead 3-13



STRUCTURAL CONTAMINANT SOURCE MANAGEMENT STRATEGIES

Structural contaminant source management strategies involve building structures or devices to prevent contamination and maintain or improve source water quality. Structural contaminant source management strategies prevent leaks or contamination or stop leaks at their source, divert hazardous or toxic components of a waste stream, or encourage the filtration or infiltration of wastewater to allow natural processes to remove contaminants.

Structural contaminant source management strategies built in an urban environment are most effective, both in cost and in operation, when they are built into developments from the very beginning. Communities can adopt subdivision controls to add specific conditions to development and regulate the division of land into lots. Structural contaminant source management strategies for the urban environment include:

- ♦ Drainage requirements to assure a subdivision's drainage system is managed with water quality and recharge in mind. Advanced engineering designs are used for roads within the subdivision; for example, on-site infiltration is used instead of curbs and gutters. Storm water and road runoff may be pre-treated to reduce contaminant loads. Storm water may be retained on-site for recharge.
- ♦ Storm water ponds to hold runoff to reduce flooding and remove suspended solids. Up to 90% of suspended solids may be removed if water is held over 24 hours.
- ♦ Infiltration basins or trenches built to trap and hold water so that it allows percolation and recharges the groundwater.
- ♦ Porous pavement to let precipitation infiltrate into the ground before it can runoff, thus effectively eliminating the problems associated with runoff. Porous pavement needs porous soils and gently sloping land to work effectively. It can remove both suspended and dissolved solids. One problem with porous pavement is that it may fill up with sediment and crack during freeze/thaw periods.
- ♦ Grassed swales (i.e. constructed, grass-lined channels) to direct runoff and remove particulates. Grassed swales allow some storm water infiltration and pollutant removal on-site and reduce the speed of storm water runoff.
- ♦ Constructed wetlands to remove both suspended and dissolved solids. Constructed wetlands can also be used to control storm water runoff.

Impervious surfaces (e.g. paved surfaces and rooftops) often contribute to non-point source pollution and can impair the quality of source water. Precipitation runs over these surfaces, picking up and transporting whatever lies on the surface. A balance needs to exist between the amount of impervious surfaces and an area's drainage system.

Structural Strategies



- ♦ Machinery or Operations-focused
- ♦ Vegetative Strategies
- ♦ Agricultural Best Management Practices (BMPs)

Overhead 3-14

Structural contaminant source management strategies associated with machinery or operations include:

- ♦ Secondary containment structures, such as oil-retaining catch basins, containment berms for above ground storage tanks, or impervious surfaces for tank placement;
- ♦ At animal feeding operations, earthen ridges or diversion terraces to direct surface flow away from animal waste;
- ♦ Leak detection devices on storage tanks, including automatic tank gauges, vapor monitoring, and groundwater monitoring;
- ♦ Segregated floor drains from wastewater carrying hazardous or toxic wastes; and
- ♦ Devices to collect and store wastewater for proper disposal.

Some structural contaminant source management strategies use vegetation to filter out contaminants before they reach water bodies or seep into groundwater. Vegetation can slow the speed of runoff to prevent erosion and mitigate the damage caused by runoff over farmland, roads, or in urban areas. Examples of vegetated structural contaminant source management strategies include constructed wetlands; vegetated buffer strips along shorelines; or grassed swales or depressions that collect runoff, encourage infiltration, or reduce erosion.

In rural areas contaminant source management strategies called best management practices (BMPs) can be used to maintain and improve water quality. BMPs vary according to the type of agriculture practiced in a region. For example, in forests BMPs are used in the design and construction of haul roads, for skid trails and landings, for post-disturbance erosion control, for seasonal operating restrictions, and for helicopter logging. In agricultural settings, BMPs include the judicious use of agricultural chemicals, rotational grazing, animal waste management, contour farming, crop rotation, conservation tillage, terraces, buffer strips and grassed waterways.



Tip for Workshop Presenters

For more information about the structural contaminant source management strategies that have been successfully built and maintained in your area, invite a representative from your local Natural Resources Conservation Service to attend your workshop and talk about the variety of programs and funding available to landowners to improve the water quality within a source water protection area.

Source Water Protection: What Works Best

A combination of regulatory and voluntary strategies that addresses a community's specific characteristics and needs -
a source water protection program tailored to fit the priorities of the community.

Overhead 3-15

A variety of contaminant source management strategies are available to prevent pollution, control contaminants at the source, or treat wastewater. One strategy alone usually is not sufficient; a combination of strategies work best. In choosing the most appropriate measures, local government officials and water system operators should consider their situations, and may need to prioritize the implementation of specific strategies to make the most of the resources available to them.



Tip for Workshop Presenters

Refer to **Part Five** of this workshop guide for small group activities that may be used to help you prioritize strategies and activities.

Local government officials should look creatively at existing ordinances and regulations. They may be able to use rules passed for other reasons to address source water issues. For example, if special permits are allowed when necessary to protect public safety or health, it is possible that they could be used for source water protection.

The selection of contaminant source management strategies will be based on a variety of factors, including the physical properties of the watershed (i.e. annual precipitation, soil type and drainage, groundwater and surface water hydrology, and space limitations), land uses and potential contaminants, type of contamination problem (e.g., point source or nonpoint source), public acceptance of measures, cost, maintenance needs, and aesthetics.

In cases where the drinking water source crosses jurisdictional boundaries, regional cooperative agreements and authorities can be used to protect source water. For example, in many cases, surface water is taken out of major river systems that drain huge, highly industrialized watersheds. A community can still protect its source water by:

- ♦ Developing a knowledge base of the entire source and the contaminant potential that exists.
- ♦ Knowing the treatment plant's capabilities and limitations.
- ♦ Establishing a monitoring and communication network.
- ♦ Preparing a contingency plan with specific emergency response procedures.
- ♦ Working with upstream and downstream communities to develop a plan to protect the resource.



Discussion Point

What types of contaminant source management strategies are currently being used in your community? If there are not any strategies being used, why not? Which would work best for the area? Why? How can communities overcome local apathy and lobbying against source water protection?

Contingency Planning



Plan of Action in Case of:

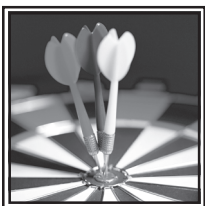
- ♦ Hazardous Spills
- ♦ Emergencies
- ♦ Contamination
- ♦ System Failure
- ♦ Increases in Demand

Overhead 3-16

SOURCE WATER PROTECTION THROUGH CONTINGENCY PLANNING

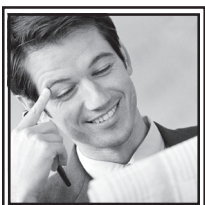
Contingency planning is a blueprint for what to do when a potential threat becomes an imminent threat. It helps a community plan in anticipation of a contamination event. It also helps local officials make well thought-out, educated decisions, even when they are quick decisions made under stress. For example, a contingency plan would outline options for a community when a railroad car full of hazardous waste derailed and spills its contents onto the ground 150 feet from one of the community's wellheads. Having a contingency plan increases the likelihood that correct and immediate action will be taken and any damage, both in the long and short term, will be minimized.

Getting the community involved in the early stages of contingency planning also means the community is aware of their role and civic responsibilities under the plan. Opportunities for cooperation and the sharing of resources may also occur. Because community members are aware, they are more likely to respond quickly to community needs in case of an emergency.



Major Point to Remember

Ideally the community should also be involved in the development of the contingency plan. Only through community involvement can the plan truly reflect the values and priorities of the community.



Workshop Presenters

Contingency planning should include all aspects of emergency drinking water protection - at the source, at the treatment plant, and through the delivery system. Since September 11, 2001, public water systems, with support from the federal government, have made considerable efforts to assess their vulnerability to possible terrorist attacks and develop emergency response plans based on these assessments. For more information about public water systems and infrastructure security, visit *Water Infrastructure Security* at www.epa.gov/safewater/security.

Contingency Planning

Basic Plan:

- ♦ Contact Information to Mobilize the Emergency Response Team

Full Plan:

- ♦ Identify Potential Threats
- ♦ Formulate Response Scenarios
- ♦ Determine a Trigger Point for when to Respond

Overhead 3-17



The most basic contingency plan consists of a phone list of everyone to call in case of an emergency. This list is often the community's emergency response team. The team list should include the names of the most current contacts, their resources and responsibilities, and their contact information (phone, fax, etc.). Contingency plans may also identify agencies, departments and consultants beyond those on the immediate emergency response team. The listing should include their scope of services and the expertise of each contact. The nature of the emergency will determine exactly who will be needed in a particular case. In some cases, sources of financial support, such as Federal Emergency Management Agency and U.S. Department of Homeland Security, will be needed. This information must be kept current and serve as a "living" document. Old, out-of-date information is absolutely useless in an emergency situation.

A more extensive contingency plan builds on the information obtained in the drinking water source assessment's Contaminant Source Inventory. An extensive contingency plan:

1. Identifies potential threats to the drinking water source;
2. Formulates responses to various threats. Once potential threats are identified, a variety of scenarios, or "what if" type statements are developed to help the community decide what to do if any potential contamination threats are not contained and threaten or contaminate the community's drinking water. The goal is to prevent and/or minimize contamination or obtain an alternate drinking water supply; and
3. Determines a trigger or signal for when to respond. It is important the community accurately recognize the nature of the threat and tailor the response accordingly.

The contingency plan should list the various resources, materials, tools, and personnel that are organized and are available to respond to an emergency. This list must also be kept current.

Those who are most likely to be directly involved in any emergency response must be involved in the development of the contingency plan. People who work with or transport hazardous chemicals, especially those in the wellhead or watershed protection areas, should also be involved in the development of the contingency plan. More than likely, these specialists will be the ones reporting any emergency, and they will also be the ones who have the materials and expertise to manage an emergency.



Workshop Presenters

Most communities will have some type of contingency plan developed for use in case of an emergency. Obtain a copy to show during the workshop. Ask the participants if they think the plan needs to be expanded, and if so, who needs to be contacted to initiate the planning process.



Tip for Workshop Presenters

The true value of contingency planning becomes clear in an emergency situation. Whether the emergency is caused by a natural disaster (e.g. a hurricane or flood), by human error (e.g. the Blackout of 2003), or terrorism, the planning process used to prepare for these emergencies is essentially the same. For more information on contingency planning and emergency response plan development, visit *Water Infrastructure Security* at www.epa.gov/safewater/security.

Contingency Planning

Long-Term Plan:

- ♦ Identify Future Supplies to Accommodate Growth
- ♦ Comprehensive Monitoring Program

Overhead 3-18

A contingency plan should also address the potential long-term replacement of the existing drinking water supply. This part of the plan would identify whether alternative drinking water sources exist, where they are, and how they can be obtained. The costs of replacing the current source of drinking water should also be analyzed. This analysis often can be used to clearly show local decision-makers and the community how valuable the current, good, clean, safe drinking water supply is to the community. Actions taken to maintain its quality may, in the long run, keep the community from making costly investments in an alternative drinking water source.

The most successful drinking water source protection programs include provisions to monitor and periodically evaluate the program's effectiveness through water quality and site monitoring. Program evaluation may include routine monitoring, monitoring to evaluate contaminant source management strategy effectiveness, special studies, and the development of an early-warning system.



Discussion Point

What do you think is the number one threat to the security of your drinking water supply? Are you concerned about the security of your public water system? Do you think enough is being done to protect the system and plan for possible emergencies?

Source Water Protection

It is because of people that we protect drinking water sources, but it is only through people that we can do so.

Source Water Protection **MUST** begin with an active and involved team of community representatives.



Overhead 3-19

Successful source water protection efforts meet the needs of the community as a whole. When developing a source water protection program, communities need to include a variety of stakeholders. At the very least, relationships and lines of communication should be established with the following stakeholders:

- ♦ County departments and agencies
- ♦ City departments and agencies
- ♦ Utilities/service districts
- ♦ Regional agencies or region-wide nongovernmental groups
- ♦ State agencies
- ♦ Tribal leaders
- ♦ Federal agencies
- ♦ Private property owners/developers/property-owner associations
- ♦ Special interest associations, such as the Izaak Walton League and Kiwanis International
- ♦ Recreational interests
- ♦ Open-space preservation/environmental groups
- ♦ Public health officials
- ♦ Populations with special health issues, such as immune-compromised persons, senior citizens, and pregnant and nursing mothers

Teams and/or committees may also be built to provide consistent support, feedback and involvement in the source water protection process.

Groundwater Guardian

Groundwater Guardian is a program of The Groundwater Foundation that provides a framework for community action and groundwater protection by providing recognition, support, and lessons learned.

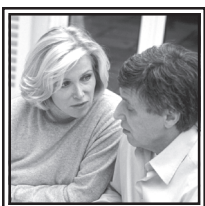
Overhead 3-20



Groundwater Guardian (GG) is a program of The Groundwater Foundation that helps communities get organized to take action on behalf of groundwater. Groundwater Guardian:

- ♦ **Provides a framework for local action.** The real work of groundwater education and protection takes place on the local level. By starting or enhancing groundwater education and protection efforts with a strong local team and a clear framework for action, teams can be successful right from the start. Groundwater Foundation staff are available to coach interested individuals through the process of building and maintaining a GG team and adopting successful groundwater education and protection activities.
- ♦ **Takes advantage of lessons already learned.** There's no need to reinvent the wheel! Teams who enter GG benefit from years of other GG Communities' experience. New GG Communities can learn how other communities have organized to take action and be effective. GG provides new teams with a variety of networking opportunities to learn from others and make their groundwater education and protection efforts stronger.
- ♦ **Recognizes communities for their efforts.** Never underestimate the power of saying "thank you" for a job well done. Each year The Groundwater Foundation recognizes communities for the work they do to educate the public and protect groundwater. Earning GG recognition sets communities apart. GG designation also helps communities get positive attention for groundwater-related work that is all too often overlooked or taken for granted.
- ♦ **Provides an incentive to keep activities going year after year.** To be successful, groundwater education and protection must be ongoing. While the specific nature of the activities may change from year to year, recognition helps to make sure progress is made on a community's groundwater education and protection activities.

For more information about teams, team-building, or the Groundwater Guardian program, contact The Groundwater Foundation at 1-800-858-4844 or visit www.groundwater.org.



Discussion Point

Does a team or committee of citizen representatives exist in your community that focuses on drinking water issues in particular? Water issues in general? Natural resources issues in general? If no team or committee currently exists, would you be interested in forming a team?

Part Four

SOURCE WATER PROTECTION - CASE STUDIES

Goal

To identify existing programs that may be used to facilitate elements of the source water assessment and protection process

Suggested Time
30 minutes



CASE STUDIES

Case studies are valuable tools that provide concrete examples of how communities develop and implement source water protection strategies and programs. Select case studies that mirror the conditions in your workshop participants' communities (i.e. small town case studies for participants from small towns; case studies of groundwater-based systems for participants whose source of drinking water is groundwater.) Workshop participants will then be more likely to believe their community could implement similar source water protection strategies using similar tools. Case studies are generally presented in person, on video, or in writing (i.e. electronic or print).



"IN PERSON" CASE STUDIES

Often the best case studies are live testimonials from individuals working to implement source water protection strategies in nearby communities. These individuals are familiar with state and local conditions and should have something in common with your workshop participants. Having an experienced person on-hand to answer specific questions will also make the workshop an educational event that meets the participants' individual needs. On the other hand, neighboring communities may also be rivals. In these cases, a first hand account from a far away community with similar characteristics facing similar problems or a regional or national expert may be more effective.

To locate potential case study speakers, contact the agencies and organizations promoting source water protection in your state for references. USEPA's Networking Tools website (www.epa.gov/ogwdw/protect/netools.html) and the Groundwater Guardian Community network (www.groundwater.org/Active/gg_list.asp) are also good sources of potential case study speakers.

VIDEO CASE STUDIES

Many "live" testimonials have been recorded and are available on video. Video case studies are excellent resources that can be shown anytime, anywhere, to any audience is willing to view them. The following videos feature wellhead and source water protection case studies (videos listed are free unless otherwise noted):

- ♦ *An Ounce of Prevention*, Wisconsin Department of Natural Resources (www.dnr.state.wi.us/org/water/dwg/gw/whp/video.htm) - This 16-minute video shows how three Wisconsin communities formed committees of local citizens and technical experts who successfully used wellhead protection planning to safeguard their valuable water supplies.
- ♦ *Protecting Drinking Water on Tribal Lands*, Water Education Foundation (www.watereducation.org/store/) - This 30-minute video explains the importance of developing a source water assessment and protection program by profiling three tribes that have created programs. Funded by a grant from the USEPA, the video

complements the Water Education Foundation's 109-page workbook, *Protecting Drinking Water: A Workbook for Tribes*, which includes a step-by-step work plan for Tribes interested in developing a protection plan for their drinking water. (\$20 plus S&H)

- ♦ *Protecting Our Life Source*, Pueblo of Acoma (For additional information or copies send a written request to: Fidel Lorenzo, Director/Liasion; Haaku Water Office; P.O. Box 309; Acoma, NM 87034.) – This 22-minute video combines the cultural rich history of the Tribe's drinking water resource with 21st century water quality protection innovations that protect the Tribe's drinking water and promote economic growth.



WRITTEN CASE STUDIES

Written case studies, whether available on the Internet or in print, can be good sources of information. Numerous written case studies are available (case study documents are free unless otherwise noted):

- ♦ *The Community Dynamics of Source Water Protection: The Structure and Dynamics of the Human Dimensions of Source Water Protection in the Memphis Metropolitan Area*, John D. Wingard, Ph.D., Department of Anthropology, University of Memphis (www.sfaa.net/eap/wingard/wingardconf.pdf) - This case study explains why Memphis' unique groundwater resource, the Memphis Sand aquifer, makes protecting it even more challenging. The article also discusses the challenge of convincing this generation to protect natural resources for generations far into the future.
- ♦ *Consensus Building: A Primer for Local Leaders*, The Groundwater Foundation (www.groundwater.org/sc/sc.html) - Taking the lead in community groundwater protection is often not an easy task. Local leaders who support groundwater protection advance both the environmental health and economic vitality for their community. This booklet is designed to help local leaders build consensus for water protection initiatives and looks at groundwater protection as a consensus building process. Case studies and information about the Groundwater Guardian program are also included. (\$9.95 plus S&H)
- ♦ *Groundwater Guardian Profiles*, The Groundwater Foundation (www.groundwater.org/sc/sc.html) - This booklet is filled with activity ideas, community information, and affiliate services from each of the currently designated Groundwater Guardians. Each profile describes the Groundwater Guardian's groundwater-related issues, contact information, and the activities and/or services implemented. The *Profiles* are a great resource for communities looking for activity ideas and for anyone who wants to know more about grassroots action to protect groundwater. (\$15.95 plus S&H)



- ♦ *Guide to Developing a Source Water Protection Plan*, Pennsylvania Department of Environmental Protection (www.dep.state.pa.us/dep/deputate/watermgt/wc/Subjects/SrceProt/source/default.htm) - This resource features written and video case studies of three Pennsylvania communities – Telford Borough, that uses groundwater; and Allentown and Reading, that use surface water.
- ♦ *Let's Make a Difference: Mobilizing for Community Action*, The Groundwater Foundation (www.groundwater.org/sc/sc.html) - There is no need to reinvent the wheel! Groundwater Guardian team representatives from across the country share valuable information about how to organize community efforts, including identifying leadership, developing a team, holding effective meetings, maintaining momentum, and recognizing a job well done. (\$12.95 plus S&H)
- ♦ *Local Source Water Protection*, U.S. Environmental Protection Agency (www.epa.gov/safewater/protect/localswp.html) - This web site features case studies of local source water protection programs, the source water protection plan for Plaistow, New Hampshire, watershed protection case studies, sample groundwater and watershed protection ordinances, and many other resources that provide examples of how communities protect their source water.
- ♦ *Michigan's Drinking Water: Case Studies & Success Stories*, Groundwater Education in Michigan (GEM) Program (www.gem.msu.edu/casestd/casestd.html) - This website features a variety of groundwater protection case studies and success stories intended to inspire other communities to take similar action.
- ♦ *Nonpoint Source News-Notes*, U.S. Environmental Protection Agency (notes.tetrattechffx.com/newsnotes.nsf) - This newsletter is a periodic report on “the condition of the water-related environment, the control of nonpoint sources of water pollution, and the ecological management and restoration of watersheds.” This website address is for the newsletter’s search engine. Simply type in “source water protection” to access a variety of case studies on how Clean Water Act and other water quality programs can be used to protect source water.
- ♦ *Source Water Case Study for Charlotte County*, Virginia Rural Water Association (www.vrwa.org/sourcewater/casestudy.htm) - This case study includes a sample “Resolution of Interjurisdictional Cooperation” and explains how communities in Charlotte County agreed to work together to develop a countywide source water protection plan.
- ♦ *Success Stories and Case Studies*, U.S. Environmental Protection Agency (www.epa.gov/water/citizen/case.html) - This website features a comprehensive listing of all US EPA’s water-related program success stories and case studies.



- ♦ *Using Technology to Conduct Contaminant Source Inventories: A Primer for Small Communities*, The Groundwater Foundation (www.groundwater.org/pe/actt/ACTT_Primer1202.pdf) - This primer was developed to prepare smaller communities to conduct a contaminant source inventory using various technologies, such as geographic information systems and global positioning systems. The primer features 11 case studies from communities across the United States, a technology review, online resources, and general information about conducting a contaminant source inventory. (Free for download; \$19.95 for a printed copy.)
- ♦ *Wellhead Protection: Lessons Learned Through Local Stewardship*, The Groundwater Foundation (www.groundwater.org/sc/sc.html) - This booklet describes the basic concepts and steps of wellhead protection. Ten Groundwater Guardian Communities active in the wellhead protection process share key elements, outcomes, and obstacles encountered. (\$9.95 plus S&H)

Part Five

SOURCE WATER PROTECTION - SMALL GROUP ACTIVITIES

Goal

To actively think about source water protection strategies that may address potential contamination concerns in their community and how to implement them.

Topic	Material
Small Group Activities	Handouts 5-1, 5-2, 5-3, 5-4

Suggested Time
60 minutes



SMALL GROUP ACTIVITIES

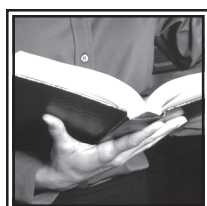
Small group activities are excellent follow-up activities to the information presented in **Parts One** through **Four**. The activities give workshop participants an opportunity to reflect and then talk about what they have just learned. The activities give participants an opportunity to ask additional questions. And more importantly, the activities give participants an opportunity to discuss a number of specific source water protection strategies that may be effective in their communities.

From a workshop presenters' standpoint, small group activities are an excellent way to find out if participants have absorbed and understood the information provided to them. Generally speaking, if participants sit with blank stares and hardly participate in the activities, it means they have developed no interest in source water protection and do not see how or feel it could benefit them. If participants take part in the activities but need a lot of coaching, it generally means they are willing to learn more about source water protection, but its basic principles and concepts have not "sunk in" yet. And if participants are very involved in the activities and talk freely about the situations in their communities, it generally means they are more likely to take what they have learned during the workshop and initiate source water protection at home.

A variety of small group activities may be used to promote source water protection – everything from model exercises to facilitation activities. Contact your state drinking water agency and/or local source water protection professionals to find out what small group activities have been successful in your area.

Groundwater Foundation staff have found the following activities to be effective tools that get workshop participants thinking about specific source water protection strategies and how they may be implemented in their community:

- ♦ **All on the Wall** – an activity to develop a list of source water protection strategies that would be the most effective;
- ♦ **Decision Grid** – an activity to take the strategies developed in the "All on the Wall" activity and prioritize them according to impact and ease of implementation;
- ♦ **Force Field Analysis** – an activity that helps stakeholders identify potential opportunities and obstacles to implementing source water protection strategies;
- ♦ **Sequential Questioning** – an activity to gauge the participants' attitudes toward source water protection and their perception of the community's willingness to implement source water protection strategies.



Refer to **Handouts 5-1 through 5-4** for detailed instructions on how to conduct these activities.*

*Additional information about these and other small group activities may be found in *Facilitating with Ease!* by Ingrid Bens.

Part Six

SOURCE WATER PROTECTION - IMPLEMENTATION ASSISTANCE

Goal

To identify sources of technical and financial assistance that may be used to implement the source water protection strategies developed in Part Five of this workshop guide.

Suggested Time
60 minutes



IMPLEMENTATION ASSISTANCE

Once a community has prioritized its source water protection strategies, it is time to begin developing specific implementation plans and identify potential sources of implementation assistance. The type and amount of assistance a community needs will vary considerably, depending on a community's source water protection strategies and resources; however, a community must be confident that, in time, resources will become available to help it reach its source water protection goals. Just by having a plan and ideas for protection strategies in place, a community will be ready to take advantage of funding and other assistance opportunities as they become known and available to a community.

The best sources of information regarding implementation assistance are those available at the state and local level. Financial and technical assistance opportunities vary widely across the country, and by identifying state and local resources first, communities can begin to develop working relationships with those assistance providers whose mission is to serve them. Contact your state drinking water agency for information about the source water protection assistance available in your area.

The *SWP Technical Assistance Fact Sheet* provided by the North Carolina Department of Environment and Natural Resources (wse20.deh.ehnr.state.nc.us/swap/pages/assisFactsheet.htm) is an excellent example of a state-specific one-stop shop for a variety of technical assistance providers. Refer to this list and then contact the state-specific equivalent in your area.

The *Technical Assistance Center for Water Quality* website developed by the Center for Water Resource Studies at Western Kentucky University (water.wku.edu/links/support.html) is an example of a state resource that provides links to state, regional and national assistance providers.

More information about financial assistance for source water protection is available from the resources listed below:

- ♦ *Financial Assistance Tools*, U. S. Environmental Protection Agency (www.epa.gov/safewater/protect/financial.html) - This website offers a comprehensive list of potential sources of financial assistance available to communities. For example:
 - ♦ Drinking Water State Revolving Funds (DWSRF) - States may loan a percentage of their DWSRF to communities to acquire land and conservation easements. States may also use DWSRF to provide technical assistance through source water protection programs and fund several types of source water protection activities. Check with your state drinking water agency to find out how your DWSRF is being used to support local source water protection activities.



- ♦ Clean Water State Revolving Fund (CWSRF) – States use their CWSRF to provide low or no-interest loans for projects that protect the quality of surface water and groundwater. Examples of CWSRF source water protection activities are: removing leaking underground storage tanks; installing agricultural BMPs; restoring wetlands; and replacing failed septic systems. Check with your state drinking water agency to find out how your CWSRF is being used to support local source water protection activities.
- ♦ *Funding for Source Water Protection Activities*, U.S. Environmental Protection Agency (www.epa.gov/safewater/protect/pdfs/guide_swp_swp_funding_matrix.pdf) - This document lists potential sources of federal financial assistance for specific source water protection activities, primarily those from the U.S. Environmental Protection Agency, the U.S. Department of Agriculture, and the U.S. Department of the Interior.
- ♦ *Environmental Finance Center Network*, U.S. Environmental Protection Agency (www.epa.gov/efinpage/efc.html) - Environmental Finance Centers (EFCs) provide state and local officials and small businesses with advisory services; education, publications, and training; technical assistance; and analysis on financing alternatives. Nine EFCs are located throughout the country. Visit the EFC website to locate the center nearest you.

Part Seven

SOURCE WATER PROTECTION - EVALUATION

Goal

To evaluate the workshop and the source water assessment and protection activities that follow.

Topic	Material
Workshop Evaluation Techniques	Handouts 7-1

Suggested Time
5-10 minutes immediately after the workshop
periodically during implementation of protection strategies



EVALUATION TECHNIQUES

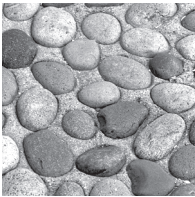
Evaluation is the process of asking how well an event, project or program worked, and how it can be improved in the future. An evaluation should be completed for all events, projects, or programs. Evaluation techniques may be quick and simple or time-intensive and sophisticated, depending on the type of information gathered and resources available. Following are recommendations for evaluation techniques and tools that may be used to evaluate a source water protection workshop and the activities that should follow. For more information about conducting an evaluation, visit the Community Toolbox at ctb.ku.edu/tools/evaluateinitiative/index.jsp and the W.K. Kellogg Foundation at www.wkkf.org/Programming/ResourceOverview.aspx?CID=281&ID=770.

SOURCE WATER ASSESSMENT AND PROTECTION WORKSHOP EVALUATION TECHNIQUES

Any of the following techniques could be used to evaluate a source water assessment and protection workshop, whether you are giving the workshop one time or many times to different audiences.

- ♦ **Group Activities** – Conducting the small group activities described in **Part Five** may give you some indication of how well your message has “sunk in.” For example, if individuals have a difficult time coming up with source water protection strategy ideas for the “All on the Wall” activity, it is a good indication that they did not absorb the information presented during **Part Three**. On the other hand, if individuals come up with a number of good strategy ideas, it is a good indication that they have taken what they have learned to heart and are now closer to implementing source water protection strategies.
- ♦ **Index Card Feedback** – This is a simple evaluation technique that will identify the major strengths and weaknesses of your workshop.
 - ♦ At the end of your workshop, hand out an index card to every workshop participant.
 - ♦ Ask them to write a plus on one side of the index card and a minus on other.
 - ♦ Ask them to write down something they liked about the workshop on the plus side of the index card, and something they did not like or thought could be improved about the workshop on the minus side of the index card.
 - ♦ Ask them to drop their card off in a neutral receptacle (e.g. a box or envelope) on their way out of the room.
 - ♦ Take a look at the results; tally them if you wish. Address participants concerns in your next workshop.
- ♦ **Written Survey** – This evaluation technique is commonly used; and in this case, it may be used to gather information about specific parts of your workshop. A sample written survey is included as **Handout 7-1**.

- ♦ Prepare a written survey in advance of your workshop. You should test the survey before you administer it to workshop participants.
- ♦ At the end of your workshop, hand a survey out to every workshop participant.
- ♦ Give them adequate time to fill out the survey – 10-15 minutes is standard.
- ♦ Ask them to drop their survey off in a neutral receptacle (e.g. a box or envelope) on their way out of the room.
- ♦ Tally the results and use participants' feedback to refine your workshop.



SOURCE WATER PROTECTION STRATEGY IMPLEMENTATION EVALUATION TECHNIQUES

The following techniques and tools can be used to evaluate source water protection strategies and programs that have been implemented in a community.

- ♦ **Observation** – This simple evaluation technique will provide instant feedback on the success of your program.
 - ♦ Throughout the implementation of a source water protection project or program, the group implementing it should take stock of how it is going and what changes may need to be made.
 - ♦ Remember – making changes as you go along can strengthen the final results.
- ♦ **Follow-up Interviews** – This technique will take more time but allows you to get feedback from people that may have been impacted, directly or indirectly, by the program.
 - ♦ These interviews can be done face-to-face, by telephone, or through a written survey.
 - ♦ Be sure the questions asked will provide you with information to allow you to improve the program in the future.
- ♦ **Participation in the Groundwater Guardian program** – Communities who participate in the Groundwater Guardian program must keep an annual record of how they are addressing groundwater and source water protection issues. Creating this record is a fundamental part of how communities earn the Groundwater Guardian designation; it is also an evaluation tool that may be used to document the progress a community has made. For more information about how the Groundwater Guardian program can be used to evaluate a community's source water assessment and protection activities, contact The Groundwater Foundation at 1-800-858-4844 or visit www.groundwater.org/gg/gg.html.



Tips for Workshop Presenters

Refer to **Handout 7-1** for a Sample Written Survey.

Overheads



PART ONE

- 1-1 Welcome
- 1-2 Protecting Drinking Water Sources
- 1-3 Source Water Assessment Process
- 1-4 Source Water Assessment Process
- 1-5 Source Water Protection
- 1-6 Source Water Protection
- 1-7 Safe Drinking Water - The Early Years
- 1-8 Safe Drinking Water Act
- 1-9 Safe Drinking Water Act
- 1-10 Safe Drinking Water Act
- 1-11 Clean Water Act
- 1-12 SDWA/CWA
- 1-13 Public Involvement: A Continuous Theme

PART TWO

- 2-1 Obtain a Copy of Your Local Assessment
- 2-2 Step 1: Identify the Drinking Water Source
- 2-3 Step 2: Identify the Potential Contamination Sources
- 2-4 Step 2: Identify the Potential Contamination Sources
- 2-5 Step 2: Identify the Potential Contamination Sources
- 2-6 Step 3: Determine Susceptibility
- 2-7 Step 3: Determine Susceptibility
- 2-8 Step 3: Determine Susceptibility
- 2-9 State Source Water Source Assessment Program
- 2-10 Step 4: Make Available to the Public
- 2-11 Step 4: Make Available to the Public

PART THREE

- 3-1 Source Water Protection is...
- 3-2 Source Water Protection Safeguards...
- 3-3 Costs of Source Water Contamination
- 3-4 Costs of Source Water Protection
- 3-5 Contaminant Source Management
- 3-6 Regulatory Strategies
- 3-7 Regulatory Strategies
- 3-8 Regulatory Strategies
- 3-9 Voluntary Strategies
- 3-10 Voluntary Strategies
- 3-11 Voluntary Strategies
- 3-12 Non-Structural Strategies
- 3-13 Non-Structural Strategies
- 3-14 Structural Strategies
- 3-15 Source Water Protection: What Works Best
- 3-16 Contingency Planning
- 3-17 Contingency Planning
- 3-18 Contingency Planning
- 3-19 Source Water Protection
- 3-20 Groundwater Guardian

Welcome



Welcome to The Groundwater Foundation's

Source Water Assessment & Protection Workshop



Overhead 1-1

Protecting Drinking Water Sources

Assessments
lead to
PROTECTION

Communities
learn to
ACT

Overhead 1-2

Source Water Assessment Process

Step One: Identify the Drinking Water Source

Step Two: Identify Sources of Potential Contamination

Overhead 1-3

Source Water Assessment Process

Step Three: *Assess How Susceptible the Drinking Water Source is to Contamination*

Step Four: *Make Assessments Available to the Public*

Overhead 1-4

Source Water Protection

Contaminant Source Management:

Keeping Potential Contaminants Away from the
Drinking Water Source

Contingency Planning:

Establishing a Plan of Action in Case of an
Emergency

Overhead 1-5

Source Water Protection

A lasting commitment
to clean, safe
drinking water!



Overhead 1-6

Safe Drinking Water - The Early Years

State public health agencies fight water-borne disease beginning in the early 1900s

States adopt multiple barrier approach:

- ◆ Prevent or treat drinking water contamination
- ◆ Focus on treatment and distribution (cross-connection control)
- ◆ Routine sanitary surveys

Overhead 1-7

Safe Drinking Water Act

Passed in 1974 to protect the nation's drinking water quality



Authorized the USEPA to:

- ◆ Identify contaminants
- ◆ Establish drinking water standards and maximum contaminant levels (MCLs)

Overhead I-8

Safe Drinking Water Act

1986 Amendments to the Safe Drinking Water Act (SDWA):

Wellhead Protection

- ◆ Completely non-regulatory
- ◆ Directing federal dollars to areas most in need
- ◆ For small systems, prevention is much cheaper than treatment

Underground Injection Control Sole Source Aquifer Designations

Overhead 1-9

Safe Drinking Water Act

1996 Amendments to the Safe Drinking Water Act (SDWA):

- ◆ Established a nationwide commitment to prevention and protection
- ◆ All source water assessments should have been completed by May 2003



Overhead I-10

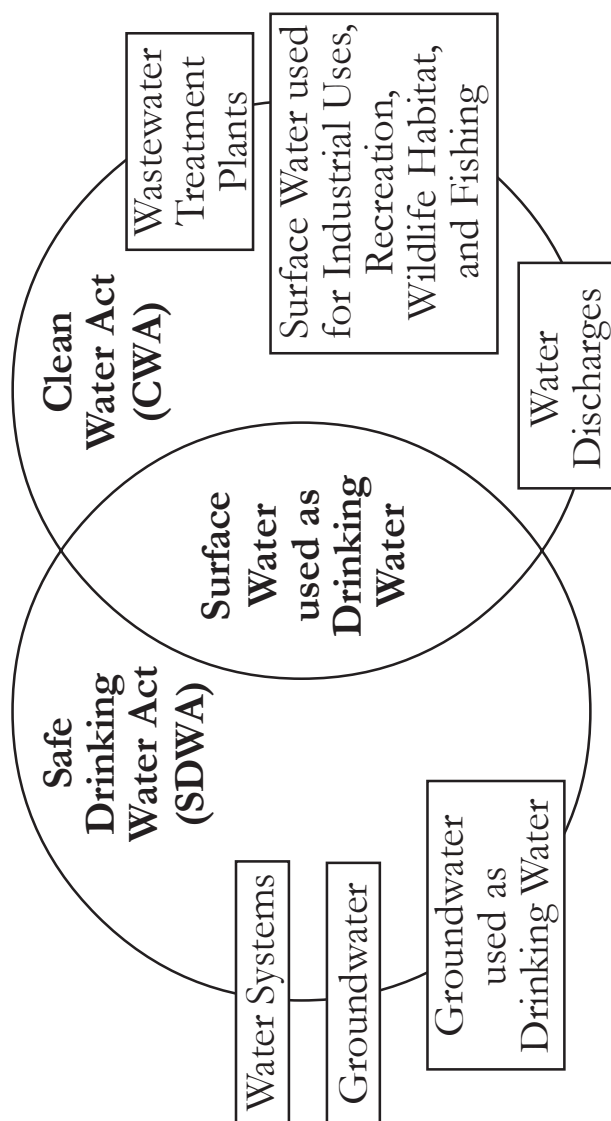
Clean Water Act (CWA)

Regulates pollutant discharges from point sources, primarily through National Pollutant Discharge Elimination System (NPDES) permits.

Controls non-point source pollution for impaired waters by developing Total Maximum Daily Loads (TMDLs).

Overhead I-I I

SDWA / CWA



Overhead I-12

Public Involvement: A Continuous Theme

Required in:

- ♦ State Assessment Program Development
- ♦ Making Assessments Available to the Public

Encouraged in:

- ♦ Assessment Process (e.g. contaminant source inventory)
- ♦ Development of local protection programs

Overhead I-13

Obtain a Copy of Your Local Assessment

Source water assessments must be made available to the public - **HOWEVER**, the sensitivity of this information means that availability varies widely.

A basic understanding of the information provided in a source water assessment is **CRITICAL** to source water protection.

Overhead 2-1

Step 1: Identify the Drinking Water Source

Groundwater

- ◆ Arbitrary fixed radius method
- ◆ Calculated fixed radius method
- ◆ Analytical method (computer modeling)

Surface Water

- ◆ Fixed distance delineation method
- ◆ Time-of-Travel delineation method

Groundwater and Surface Water

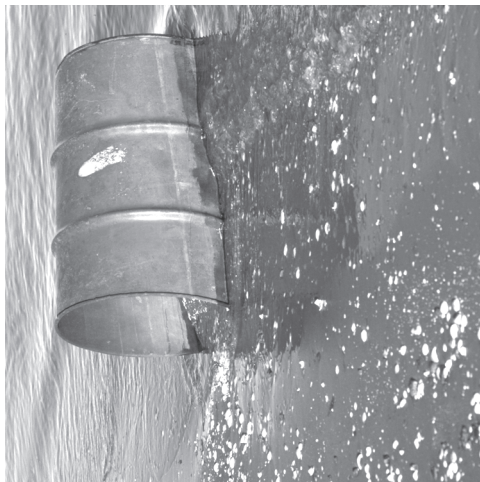
Overhead 2-2

Step 2: Identify Potential Contamination Sources

Assessments must identify sources of:

- ◆ Contaminants with a USEPA-established maximum contaminant level (MCL)
- ◆ The microorganism *Cryptosporidium*
- ◆ Contaminants regulated under the Surface Water Treatment Rule

States may also identify additional sources of contaminants, such as sources of currently unregulated viruses, that may be regulated in the future.



Overhead 2-3

Step 2: Identify Potential Contamination Sources

Methods to Identify Potential Sources of Contaminants:

- ◆ Database Search
- ◆ Windshield Survey
- ◆ Site Visits with One-on-One Interviews



Clearly should focus on known sources of contamination and problem areas.

Overhead 2-4

Step 2: Identify Potential Contamination Sources

Using Technology to Identify Potential Contamination Sources:

- ◆ Information Technology is Generally Available - You Just Have to Ask
- ◆ Information Technology is Relatively Cheap
- ◆ Volunteers Can Learn How to Collect Data Fairly Quickly - Someone with GIS Experience is Needed to Compile and Manage the Data
- ◆ Public Education is the Key to Success



Overhead 2-5

Step 3: Determine Susceptibility

The Assessment should determine

“The potential for a public water system to draw water contaminated by inventoried sources at concentrations that would pose concern.”

- USEPA Assessment Guidance

Each state must determine the susceptibility of all public water systems in the state.

Overhead 2-6

Step 3: Determine Susceptibility

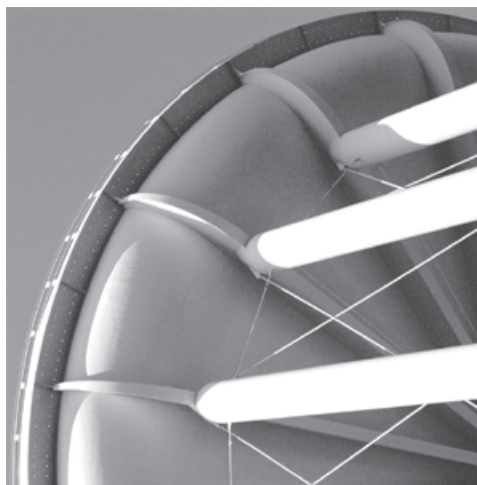
- ◆ Analyze hydrology and hydrogeology
- ◆ Understand the characteristics of potential contaminants and how they could move to reach the drinking water source
- ◆ Understand the characteristics of storage facilities that contain and land uses that may expose potential contaminants



Overhead 2-7

Step 3: Determine Susceptibility

- ◆ Evaluate the effectiveness of existing pollution prevention and clean-up programs
- ◆ Assess the strength and stability of the public water system by determining the integrity of wells and intakes



Overhead 2-8

State Source Water Assessment Program

Purpose:

Generate assessments detailed enough to develop source water protection programs.

Overhead 2-9

Step 4: Make Available to the Public

- ◆ Consumer Confidence Reports (published annually)
- ◆ Water Bill Stuffers
- ◆ Public Meetings
- ◆ Traditional Media Outlets -
press releases, newspaper articles, news conferences, public service announcements, radio, television, news, posters, flyers, brochures



Overhead 2-10

Step 4: Make Available to the Public

“Up and Coming” Media Outlets

- ◆ Cable access television
- ◆ Websites

Educational Events - Festivals and Fairs

- ◆ National Drinking Water Week

Overhead 2-11

Source Water Protection is...



Contaminant Source
Management

- ◆ Keeping Potential
Contaminants Away
from a Drinking Water
Source

Contingency Planning

- ◆ Establishing a Plan of Action in Case of an
Emergency

Overhead 3-1

Source Water Protection Safeguards...

Public Health - by reducing risks of both acute and chronic ailments



Economic Well-being of Communities - because less polluted water is less expensive to treat

Overhead 3-2

Costs of Source Water Contamination

Quantifiable Costs - treatment and remediation, finding and replacing water supplies, public information campaigns, regulatory compliance, loss of property value and tax revenue

Other Less Quantifiable Costs - health costs, lost productivity, lost economic development opportunities, lost consumer confidence

Overhead 3-3

Costs of Source Water Protection

Vary widely from community to community - basically the costs of source water protection are up to you!

Overhead 3-4

Contaminant Source Management

Structural	Regulatory Regulation of Underground Storage Tanks	Voluntary Buffer Strips
Non-Structural	Consumer Confidence Reports	Volunteer Monitoring

Overhead 3-5

Regulatory Strategies

Zoning - directs future development

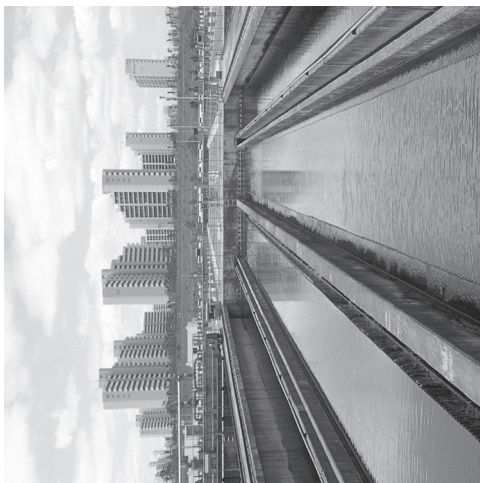
Overlay Zoning Districts - take a zoned area and add another layer of zoning regulations to it

Overhead 3-6

Regulatory Strategies

Overlay Zoning Districts may utilize:

- ◆ Land use controls
- ◆ Subdivision regulations
- ◆ Special permitting
- ◆ Performance standards (construction and operating standards)
- ◆ Growth controls



Overhead 3-7

Regulatory Strategies

- ◆ Health Regulations
- ◆ Permitting
- ◆ Inspections
- ◆ Stormwater Management

Overhead 3-8

Voluntary Strategies

- ◆ Land Acquisition - Donations, Purchase (Market Value Transactions)
- ◆ Conservation Easements
- ◆ Limiting Development - Cluster/Planned Unit Development
- ◆ Comprehensive Planning
- ◆ Written Agreements

Overhead 3-9

Voluntary Strategies



- ◆ Monitoring
- ◆ Water Conservation
- ◆ Agricultural Best Management Practices (BMPs)
- ◆ Other Land Management Activities

Overhead 3-10

Voluntary Strategies

- ◆ Household Hazardous Waste (HHW) Collection Programs
- ◆ Public Information, Education, and Participation Programs
- ◆ Smart Growth

Overhead 3-11

Non-Structural Strategies

Land-focused Strategies

Large-lot zoning, Cluster development, Planned Unit Developments (PUDs), Transfer of Development Rights

Home and Business-based Strategies

Overhead 3-12

Structural Strategies

Urban-focused Strategies

Drainage requirements, Storm water ponds, Infiltration basins, Porous pavement, Grassed swales, Constructed wetlands

Overhead 3-13

Structural Strategies



- ◆ Machinery or Operations-focused
- ◆ Vegetative Strategies
- ◆ Agricultural Best Management Practices (BMPs)

Overhead 3-14

Source Water Protection: What Works Best

A combination of regulatory and voluntary strategies that addresses a community's specific characteristics and needs—**a source water protection program tailored to fit the priorities of the community.**

Overhead 3-15

Contingency Planning



Plan of Action in Case of:

- ◆ Hazardous Spills
- ◆ Emergencies
- ◆ Contamination
- ◆ System Failure
- ◆ Increases in Demand

Overhead 3-16

Contingency Planning

Basic Plan:

- ◆ Contact Information to Mobilize the Emergency Response Team

Full Plan:

- ◆ Identify Potential Threats
- ◆ Formulate Response Scenarios
- ◆ Determine a Trigger Point for when to Respond

Overhead 3-17

Contingency Planning

Long-Term Plan:

- ◆ Identify Future Supplies to Accommodate Growth
- ◆ Comprehensive Monitoring Program

Overhead 3-18

Source Water Protection

It is because of people that we protect drinking water sources, but it is only through people that we can do so.

Source Water Protection **MUST** begin with an active and involved team of community representatives.



Overhead 3-19

Groundwater Guardian

Groundwater Guardian is a program of The Groundwater Foundation that provides a framework for community action and groundwater protection by providing recognition, support, and lessons learned.



Overhead 3-20

Handouts



PART ONE

- 1-1 Sample State Information
- 1-2 Additional Federal Laws and Programs that Contribute to Source Water Protection

PART TWO

- 2-1 Sample Arbitrary Fixed Radius Method Delineation
- 2-2 Sample Calculated Fixed Radius Method Delineation
- 2-3 Sample Analytical Method Delineation
- 2-4 Groundwater Delineation Method Comparison
- 2-5 Sample Fixed Distance Delineation Method
- 2-6 Sample Time-of-Travel Delineation Method
- 2-7 Sample Conjunctive Delineation
- 2-8 Sample Contaminant Source Inventory Data Sheet
- 2-9 Working with the Media

PART FIVE

- 5-1 Activity Instructions: All on the Wall
- 5-2 Activity Instructions: Decision Grid
- 5-3 Activity Instructions: Force-Field Analysis
- 5-4 Activity Instructions: Sequential Questioning

PART SEVEN

- 7-1 Sample Written Survey

SAMPLE

State Information

*This Sample State
Information
handout is designed
for Workshop
Presenter Materials
ONLY.*



Nebraska's Source Water Assessment Program SWAP for ALL Public Drinking Water Systems THE STATE PROGRAM

Groundwater

= Wellhead
Protection
(WHP)
~1400 systems

Surface Water

= mostly Omaha MUD
Missouri River intake +
a few other systems
(total <10)

Source Water Assessment

SDWA Amendments 1996 Require:

- A. Delineation of WHPA or Watershed to be protected
- B. Inventory of potential contaminant sources
- C. Vulnerability ("Susceptibility") assessment
- D. Make assessments available to the public
- E. Public Stakeholder involvement in developing the SWAP

Not required by SDWA amendments, but encouraged by EPA:

Prevention Programs

- A. Contaminant Source Management
zoning, ordinances, BMPS, etc.
- B. Contingency Planning
emergencies, contamination, well failure, new well plans, system
expansion, growth, etc.

ADDITIONAL FEDERAL LAWS AND PROGRAMS THAT

Contribute to Source Water Protection

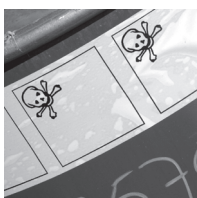
Although they do not necessarily protect sources of drinking water, a variety of federal laws have been passed that contribute to protecting and maintaining the quality of the public's drinking water supply.

**Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)**

FIFRA was passed June 25, 1947 and amended October 25, 1988. The primary focus of FIFRA is to provide federal control of pesticide distribution, sale, and use. USEPA was given authority under FIFRA not only to study the consequences of pesticide usage but also to require users (farmers, utility companies, and others) to register when purchasing pesticides.

Through later amendments to the law, users also must take exams for certification as applicators of pesticides. All pesticides used in the U.S. must be registered (licensed) by USEPA. Registration assures that pesticides will be properly labeled and, if used in accordance with specifications, will not cause unreasonable harm to the environment.

FIFRA may be used to protect sources of drinking water because it controls the storage and use of a potential contamination source - pesticides.

**Toxic Substances Control Act (TSCA)**

The TSCA was enacted by Congress in 1976 to test, regulate, and screen all chemicals produced or imported into the United States. Many thousands of chemicals and their compounds are developed each year with unknown toxic or dangerous characteristics. To prevent tragic consequences, TSCA requires that any chemical that reaches the consumer marketplace be tested for possible toxic effects prior to commercial manufacture.

Any existing chemical that poses health and environmental hazards is tracked and reported under TSCA. Procedures for corrective action also are authorized under TSCA and are used in cases of toxic spills and material contamination. TSCA supplements other federal statutes, including the Clean Air Act and the Toxic Release Inventory under EPCRA (see EPCRA below).

Resource Conservation and Recovery Act (RCRA)

RCRA (pronounced "RICK-rah"), passed on October 21, 1976, gave USEPA the authority to control hazardous waste from "the cradle to the grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous wastes.

ADDITIONAL FEDERAL LAWS AND PROGRAMS THAT

Contribute to Source Water Protection

HSWA (pronounced “HISS-wa”), or the Federal Hazardous and Solid Waste Amendments, are the 1984 amendments to RCRA that required phasing out land disposal of hazardous waste. Some of the other mandates of this strict law include increased enforcement authority for USEPA, more stringent hazardous waste management standards, and a comprehensive underground storage tank program.

Amendments to RCRA in 1986 enabled USEPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. RCRA focuses only on active and future facilities and does not address abandoned or historical sites (see CERCLA).



Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

CERCLA (pronounced SIR-cla) was passed December 11, 1980 and amended October 17, 1986 (see EPCRA below). CERCLA provides a Federal “Superfund” to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. Through the Act, USEPA was given power to seek out those parties responsible for any release and assure their cooperation in the cleanup.

USEPA cleans up orphan sites when potentially responsible parties cannot be identified or located, or when they fail to act. Through various enforcement tools, USEPA obtains private party cleanup through orders, consent decrees, and other small party settlements. USEPA also recovers costs from financially viable individuals and companies once a response action has been completed.

USEPA is authorized to implement CERCLA in all 50 states and U.S. territories. Superfund site identification, monitoring, and response activities in states are coordinated through the state environmental protection or waste management agencies.



Emergency Planning and Community Right-to-Know Act (EPCRA)

EPCRA was passed October 17, 1986. Also known as SARA Title III (Title III of the Superfund Amendments and Reauthorization Act), EPCRA was enacted by Congress as the national legislation on community safety. This law was designated to help local communities protect public health, safety, and the environment from chemical hazards.

ADDITIONAL FEDERAL LAWS AND PROGRAMS THAT

Contribute to Source Water Protection



The emergency law requires USEPA or states to set up structures for handling information on chemicals used within local communities. The information must be made available to community residents, so they may be informed of toxic chemicals being stored, used, and released in their communities. Community emergency response personnel will also use this information to respond properly to emergencies involving toxic chemical releases.

To implement EPCRA, Congress required each state to appoint a State Emergency Response Commission (SERC). The SERCs were required to divide their states into Emergency Planning Districts and to name a Local Emergency Planning Committee (LEPC) for each district. Broad representation by fire fighters, health officials, government and media representatives, community groups, industrial facilities, and emergency managers ensures that all necessary elements of the planning process are represented.

Because of EPCRA, most communities should have some foundation on which to protect their drinking source water through a contingency plan.



Underground Injection Control

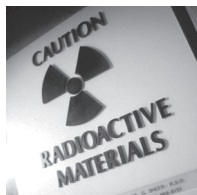
The Underground Injection Control (UIC) Program works with state and local governments to regulate injection wells and prevent them from contaminating drinking water sources. USEPA defines the five classes of wells according to the type of waste they inject and where the waste is injected.

The types of underground injection wells are:

- ♦ **Class I** wells, which are technologically sophisticated and inject large volumes of hazardous and non-hazardous wastes into deep, isolated rock formations that are separated from the lowermost underground source of drinking water by many layers of impermeable clay and rock.
- ♦ **Class II** wells, which inject fluids associated with oil and natural gas production. Most of the injected fluid is brine that is produced when oil and gas are extracted from the earth (about 10 barrels for every barrel of oil).
- ♦ **Class III** wells, which inject super-hot steam, water, or other fluids into mineral formations, and then pump the fluid to the surface. Generally the fluid is treated and reinjected into the same formation. More than 50 percent of the salt and 80 percent of the uranium extraction in the U.S. is produced this way.

ADDITIONAL FEDERAL LAWS AND PROGRAMS THAT

Contribute to Source Water Protection



- ♦ **Class IV** wells, which inject hazardous or radioactive wastes into or above underground sources of drinking water. **These wells are banned** under the Underground Injection Control program because they directly threaten the quality of underground sources of drinking water.
- ♦ **Class V** wells, which use injection practices that are not included in the other classes. Some Class V wells are technologically advanced wastewater disposal systems used by industry, but most are “low-tech” holes in the ground. Generally, they are shallow and depend upon gravity to drain or “inject” liquid waste into the ground above or into underground sources of drinking water. Their simple construction provides little or no protection against possible ground water contamination, so it is important to control what goes into them.

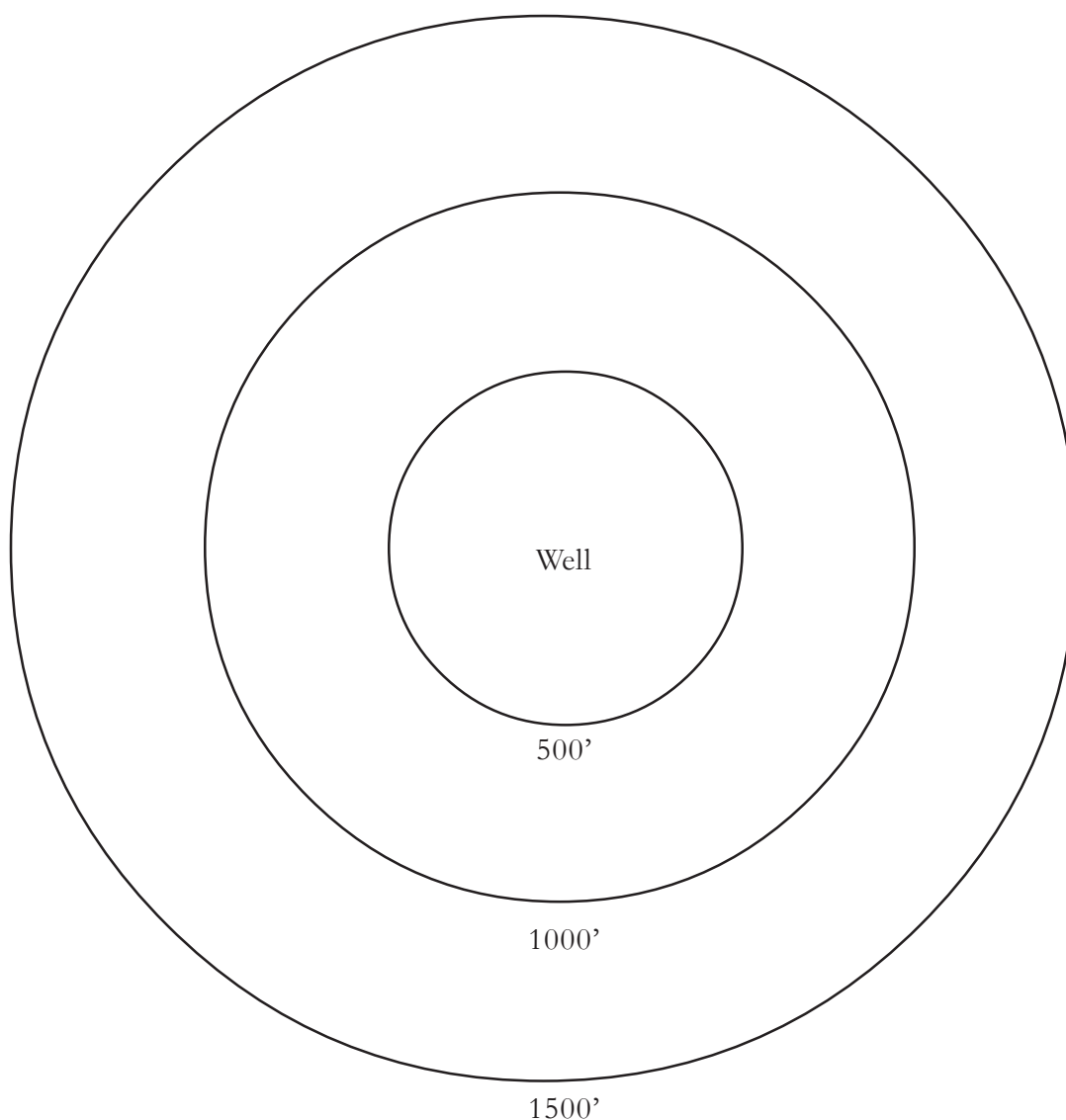
SAMPLE

Arbitrary Fixed Radius Method Delineation

Water Supply System _____ Well I.D. _____

Initial Rating _____ By _____ Date _____
(V or NV) *(State Field Person)*

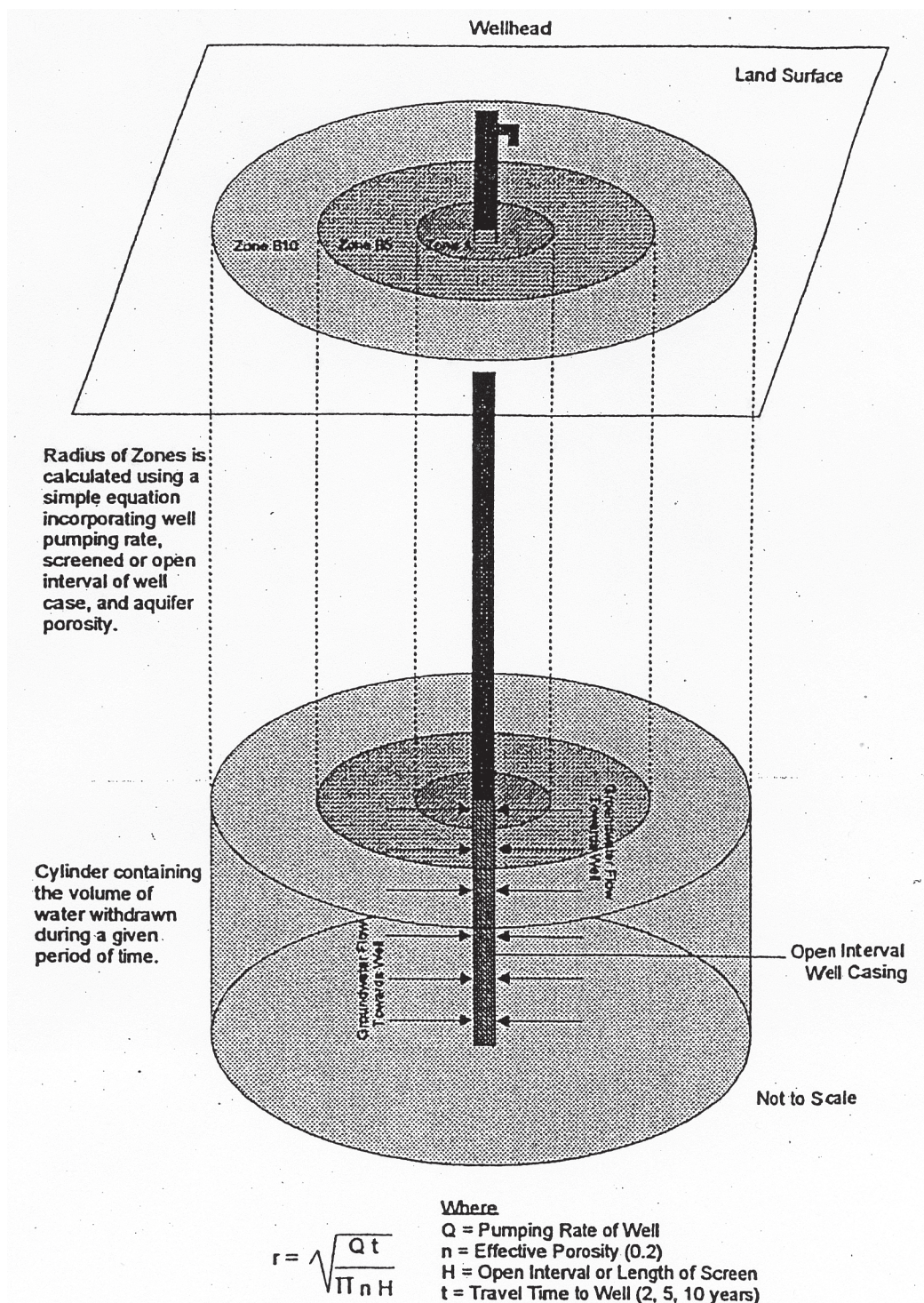
Area Map
 Scale: 1"=500'



SAMPLE

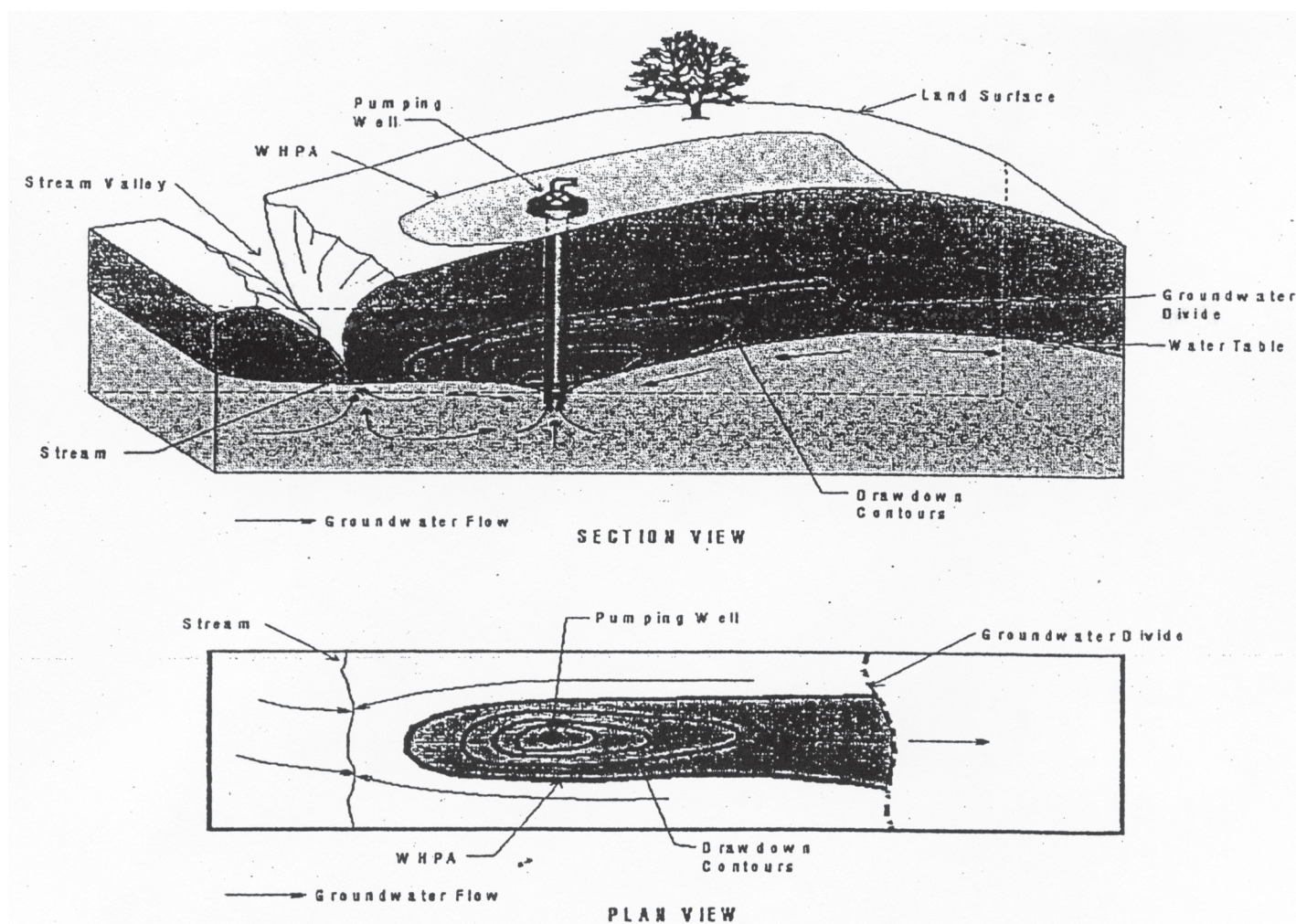
Calculated Fixed Radius Method Delineation

adapted from Washington State, "Wellhead Protection Program Guidance Document," 1995

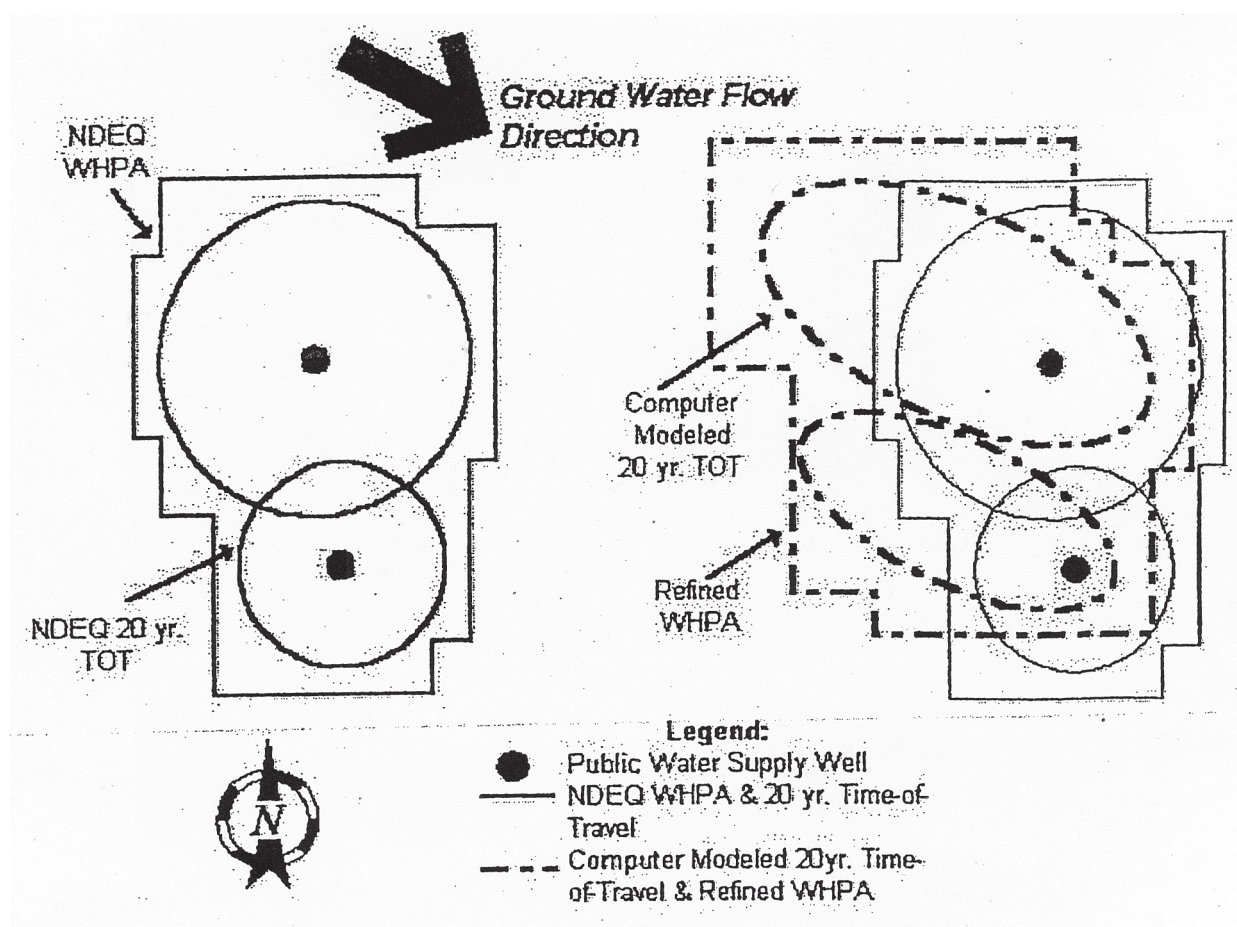


SAMPLE

Analytical Method Delineation



Groundwater Delineation Method Comparison

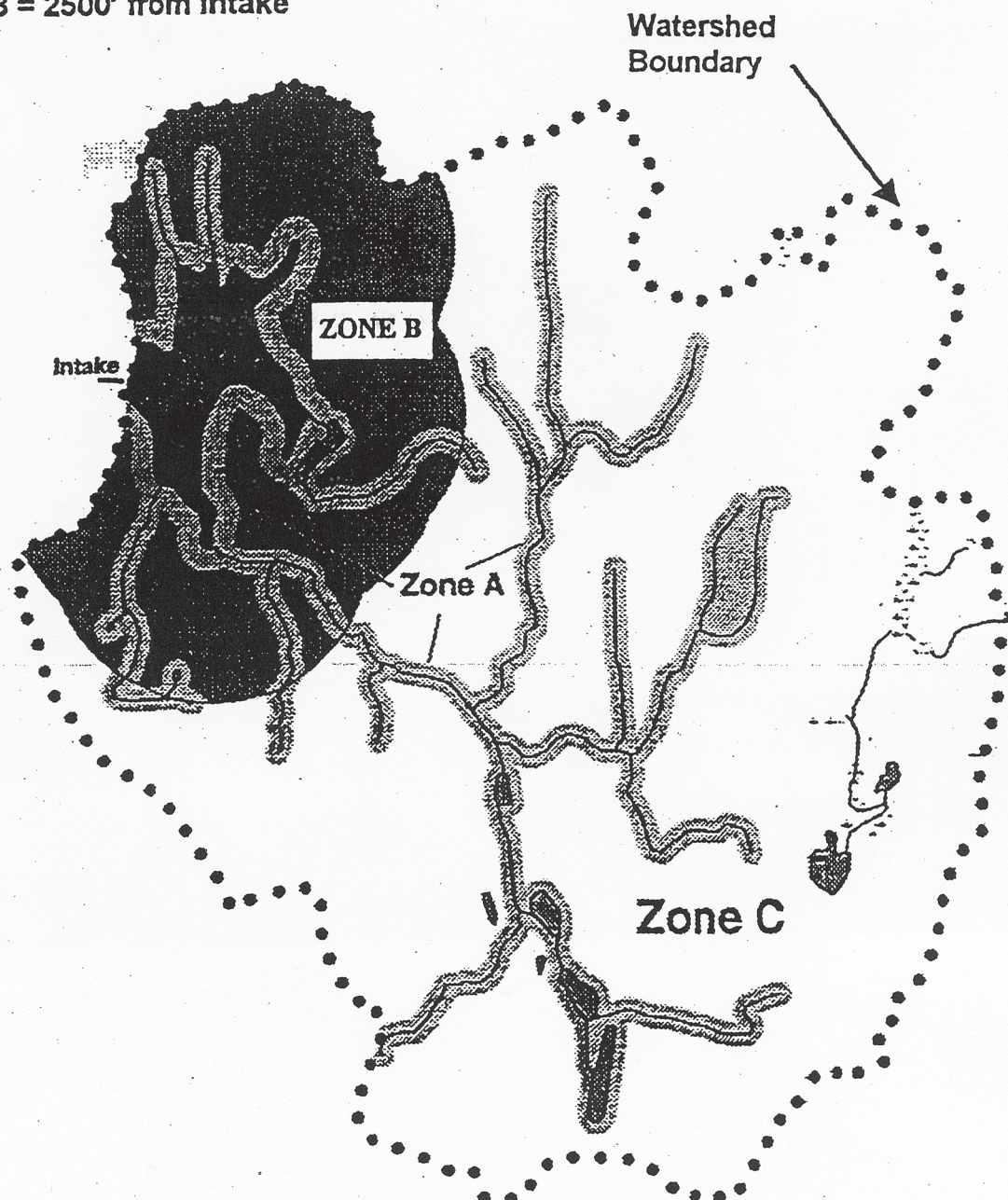


SAMPLE

Fixed Distance Delineation Method

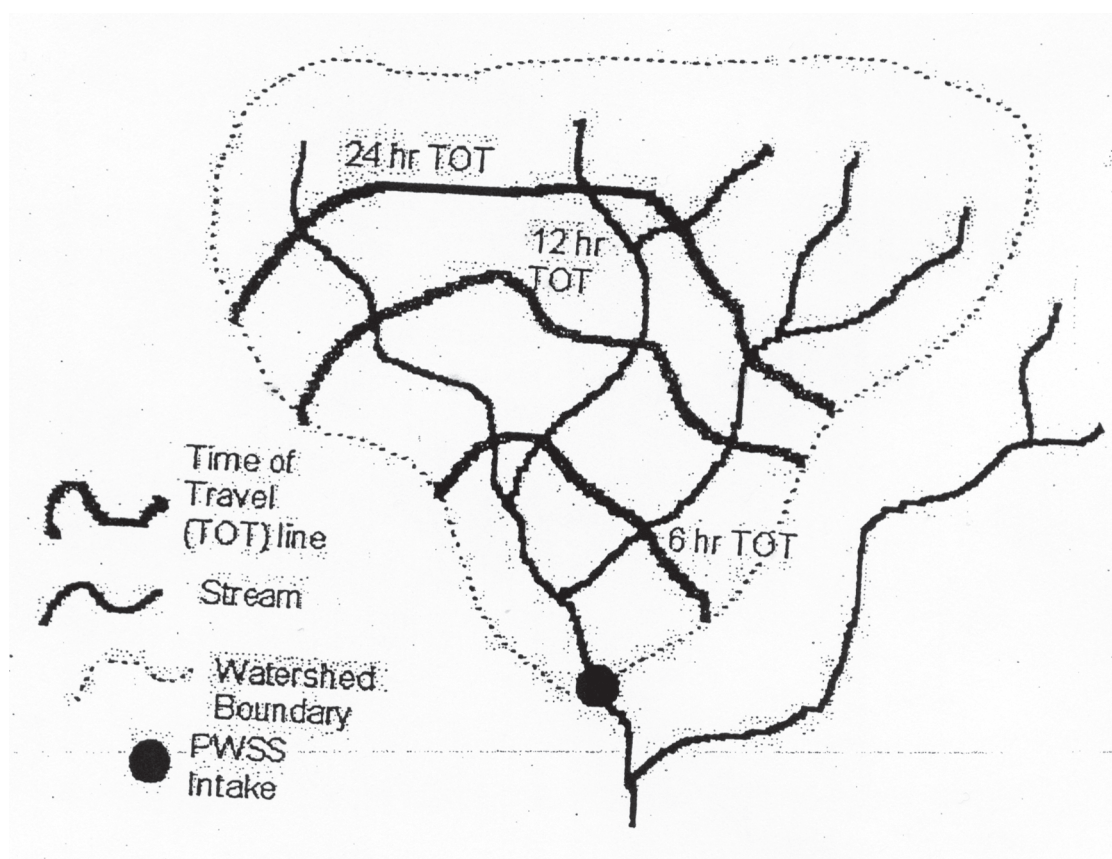
**ZONE A = 400' from reservoir or primary stream boundaries
200' from tributaries**

ZONE B = 2500' from intake



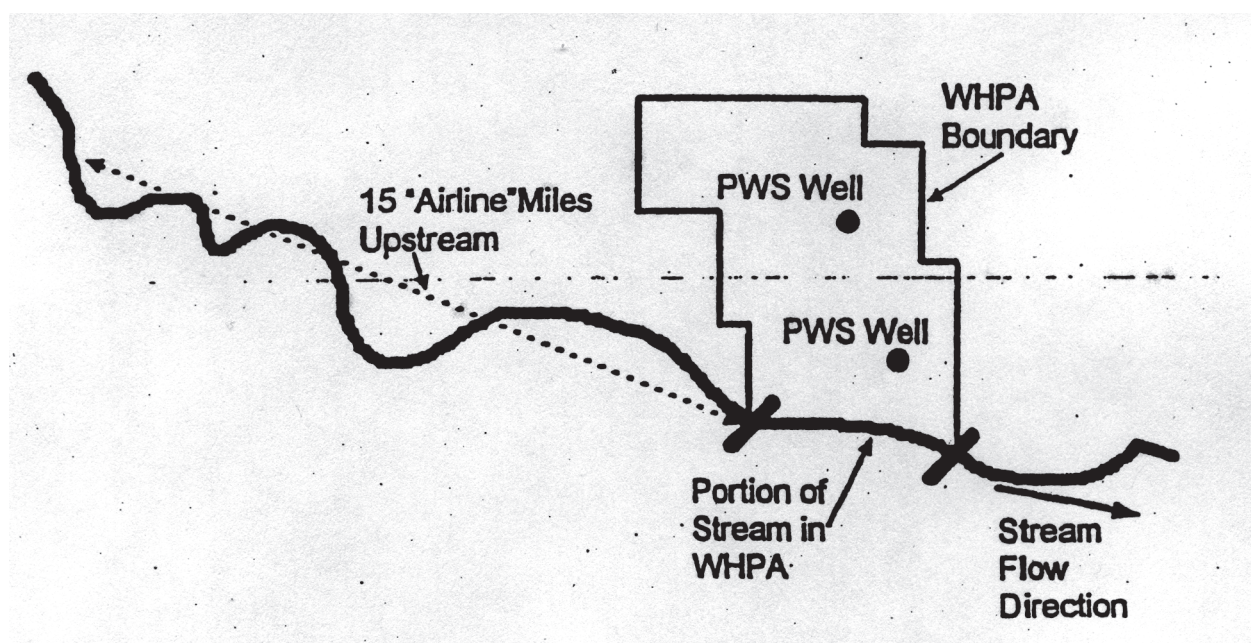
SAMPLE

Time-of-Travel Delineation Method



SAMPLE

Conjunctive Delineation



SAMPLE

Contaminant Source Inventory Data Sheet



NAME OF WATER SYSTEM: _____

Site/GPS Waypoint #/Name _____

Estimated Position Error (EPE): feet _____

Facility/Tenant/Land Use: _____

Address: _____

Spoke with: _____

Title: _____

Time the facility has been in business: _____

Previous uses of location: _____

How long ago? _____

SITE TYPE (complete reverse of sheet)

MATERIALS ON SITE (complete reverse of sheet)

NOTE ADDITIONAL OBSERVATIONS (Quantities, Number of Units--i.e. gallons, pounds, tons, cubic yards, head of livestock, other)

GPS Receiver ID: 1 2 3 (Set to Map Datum on NAD 83, GPS location format hddd.ddddd)

Collectors Name: _____ Date: _____

SAMPLE

Contaminant Source Inventory Data Sheet

SITE TYPES (MARK ALL THAT APPLY)

- | | |
|---|--|
| <input type="checkbox"/> Airport | <input type="checkbox"/> Landfill |
| <input type="checkbox"/> Car/Junk Car Lot | <input type="checkbox"/> Livestock Operation |
| <input type="checkbox"/> Cemetery | <input type="checkbox"/> Machine Shop/Autobody Shop |
| <input type="checkbox"/> Chemical Manufacturing | <input type="checkbox"/> Medical Clinic/Office/Hospital |
| <input type="checkbox"/> Cropland | <input type="checkbox"/> Meatpacking |
| <input type="checkbox"/> Concrete Manufacturing | <input type="checkbox"/> Mortuary |
| <input type="checkbox"/> Dental Clinic | <input type="checkbox"/> Nursery |
| <input type="checkbox"/> Dry Cleaner | <input type="checkbox"/> Pool |
| <input type="checkbox"/> Farmstead/Acreage | <input type="checkbox"/> Print Shop |
| <input type="checkbox"/> Foundry/Metals Processing | <input type="checkbox"/> Parking Lot |
| <input type="checkbox"/> Gas Station/Convenience | <input type="checkbox"/> Plastics Manufacturing Hospital |
| <input type="checkbox"/> Gas Station/Automotive Service | <input type="checkbox"/> Stockyard/Sale Barn |
| <input type="checkbox"/> Golf Course | <input type="checkbox"/> School/Retail Store |
| <input type="checkbox"/> Grain Elevator | <input type="checkbox"/> Vet Clinic |
| <input type="checkbox"/> Gravel Pit | <input type="checkbox"/> Other, specify: _____ |
| | _____ |
| | _____ |

MATERIALS ON SITE (MARK ALL THAT APPLY)

- | | |
|--|---|
| <input type="checkbox"/> Diesel Tanks Above | <input type="checkbox"/> Fungicides |
| <input type="checkbox"/> Diesel Tanks Below | <input type="checkbox"/> Herbicides |
| <input type="checkbox"/> Gas Tanks Above | <input type="checkbox"/> Insecticides |
| <input type="checkbox"/> Gas Tanks Below | <input type="checkbox"/> Rodenticides |
| <input type="checkbox"/> Antifreeze | <input type="checkbox"/> Other Pesticides |
| <input type="checkbox"/> Brake Fluid | <input type="checkbox"/> Lagoon |
| <input type="checkbox"/> Freon | <input type="checkbox"/> Septic System |
| <input type="checkbox"/> Transmission Fluid | <input type="checkbox"/> Private Well |
| <input type="checkbox"/> Motor Oil (parking lot) | <input type="checkbox"/> Stock Well |
| <input type="checkbox"/> Solvents | <input type="checkbox"/> Abandoned Well |
| <input type="checkbox"/> Jet Fuel | <input type="checkbox"/> Chemigation Site |
| <input type="checkbox"/> Other Fuel | <input type="checkbox"/> Arsenic (cemetery) |
| <input type="checkbox"/> Dry Cleaning Chemical | <input type="checkbox"/> Cropland, specify: _____ |
| <input type="checkbox"/> Anhydrous Fertilizer | _____ |
| <input type="checkbox"/> Dry Fertilizer | _____ |
| <input type="checkbox"/> Liquid Fertilizer | <input type="checkbox"/> Other, specify: _____ |
| <input type="checkbox"/> Chlorine | _____ |
| <input type="checkbox"/> Grain Fumigant | _____ |
| <input type="checkbox"/> Structure Fumigant | _____ |

Working with the Media

Getting source water assessment and protection-related stories in both print and electronic media is a great way to build support for a community's work in source water assessment and protection. Following are strategies that have helped The Groundwater Foundation gain publicity for groundwater education and protection issues over the years.

SECTION ONE: Building Relationships



People Make the Difference

Developing a good working relationship with members of the media is the first and perhaps most key step to getting positive media coverage. To develop these relationships, it is important to appoint one or two people within your group as the media contact. Journalists tend to like to deal with the same people repeatedly because it is less confusing for them. In addition, this allows a relationship to build between the group and the media. The media contact should know details about the group's upcoming events and feel comfortable talking to the press about them. The contact should also be able to respond quickly to request for information, quotes, and even interviews.

The most effective way for us to tell our story has been to call on those members of the media with whom we have developed a personal relationship. In our experience, print media is a good place to begin building personal contacts. Exposure in a newspaper article may lead to further coverage by television and/or radio. In addition, a story about your issue or program carried in a daily newspaper with a large circulation has a good chance of being placed on the Associated Press news service and sent to dozens of local papers across your area.

Long-term Media Relationships

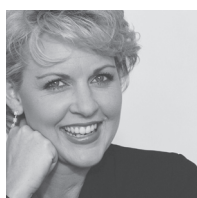
Groundwater and surface water protection is a long-term commitment, and developing a lasting relationship with media in your community can be an important part of your education and protection efforts. Maintaining a good relationship with the media will allow you to reach more people with your message.

Perhaps the most important aspect to this long-term connection with the media is the follow-up. Whether the media calls you or you contact them, follow up with a phone call or e-mail a few days later thanking them for their time and offering more information if needed. This lets them know that you are willing to work with them to get a good story for their audience.

Simply continuing to work with one reporter, newspaper, television station, etc. will also help build a lasting relationship. This helps them develop an interest for your work, and encourages future media coverage.

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SECTION TWO: Getting the Media to Notice



Get Them to Tell Your Story

One thing we've done to help us get attention is to make groundwater fun and interesting. The media love our Groundwater Festival because kids and politicians (two key groups who participate every year) getting wet and dirty make a great human-interest story. This is also the kind of story that plays well on live television because there is the opportunity for interviews, updates, and live broadcasts. Each year several area TV stations broadcast live from our Festival and also air segments about the Festival as a whole, including interviews with VIP guests, organizers, presenters, and students.

Conflict and controversy can also help pique the media's interest. However, instead of encouraging this to its natural end, we work hard to turn conflict and controversy into cooperation and this makes a good story. For example, several years ago we invited Coors Brewing Company CEO, Pete Coors, to be the keynote speaker at our Fall Symposium. Several student groups called local media and announced they planned to protest our decision by blocking the doors to the Hilton Hotel where the event was taking place. Our strategy was to invite the students to attend Pete's speech as our guests, encouraging them to question him after his talk. The media turned out in force. The speech and students highlighted our issues.

Another example occurred a few years ago when The Groundwater Foundation received a call from ABC News inquiring about a report from the Environmental Working Group on nitrate problems in both public water systems and private wells. We encouraged them to instead consider telling the positive story of ag producers in the Central Platte area of Nebraska who have been voluntarily using best management practices (BMPs) since 1986 to reduce nitrate levels basin-wide, shifting the focus from the negativity of the nitrate issues to the positive efforts of Nebraska's ag producers.

Don't be frustrated if a particular media outlet does not pick up your story immediately. Patience and persistence are also important. For example, Foundation President Susan Seacrest was interviewed by CBS News *Sunday Morning* for an appearance on the Postcards from Nebraska segment. Though the network promised the story would air within weeks after the interview, it did not appear on the program until over a year later. But the story did air and people heard about the Ogallala Aquifer, and the Foundation received some nice publicity. Another example occurred several years ago. The Groundwater Foundation received a call from NBC's Dateline about a possible story involving Groundwater Guardian. We provided several suggestions for stories. The producer seemed especially interested in profiling the heroic efforts of Gary Grant and the citizens of Tillery, North

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Carolina in their fight against area hog farming. Although NBC didn't produce the story, 60 Minutes did feature Gary Grant's work.



The Groundwater Guardian program provides many opportunities for a community to get the media to tell their story. First, the creation of a team brings together sectors of the community that may not have worked together in the past. This community involvement is worthy of a news release itself! The Groundwater Foundation gets the ball rolling with a news release to the community's local media when a local team enters the program. Second, Groundwater Guardian teams are geared for action, so teams are encouraged to invite the media to witness their on-the-ground activities.

Another great strategy is to directly involve media representatives in your project. For example, mentors for students on our Groundwater University program have included a natural resources reporter for a local newspaper and a television meteorologist. Because they participated in the event, Groundwater University received great coverage from both! We also use media personalities at the Children's Groundwater Festival. They tend to be extroverted and make great "MCs." Inviting direct participation allows them to observe your work and helps build the ever-important media relationship. We also invite reporters and editors to participate as speakers and panelists at symposiums and workshops. Journalists enjoy expressing opinions, something they usually aren't able to do in their line of work. For example, the California-based Water Education Foundation (Executive Director Rita Schmidt Sudman, 717 K Street, Suite 315, Sacramento, CA 95814, www.watereducation.org) sponsors annual briefings for members of the media on California water issues. This is another tremendously effective way to build relationships and improve news coverage because it not only brings your organization into the spotlight, it also provides exposure for important water issues in your area.

News Releases

News releases are an important strategy for disseminating information to the media. A news release is a document written in a specific format that makes an announcement or describes an event, activity, or occurrence that you believe is newsworthy.



News releases are generally organized in a particular manner. Before the actual release itself, list the date of the release, the person to contact for further information, and contact information for the person/organization including e-mail address, direct phone number, and website. Next comes the headline. This should grab the reader's attention and be as concise as possible. The first sentence of the first paragraph should begin with the location (city and state) and date. The remainder of the first paragraph should answer the questions who, what, where, when, why, and how. The following paragraphs should contain additional information that expands upon what you stated in the lead and can

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include quotes from people involved, such as a project director or team leader. The final paragraph often includes the history and background information about the group involved, such as a Groundwater Guardian team, and who the reader can contact for more information.

There are several things to keep in mind when writing an effective news release. First, keep it brief and concise. Editors receive numerous news releases each week and appreciate those that are brief and to the point. Second, write in layman's terms. Explain things simply and try to avoid using any buzzwords or technical jargon. Write your release so someone who knows nothing about your work will understand it. Third, proofread your release several times before you send it. Check and recheck for grammatical and spelling errors that would cause an editor to disregard your release. Releases full of errors are unprofessional and will not help you build a relationship with the media.

You may want to follow up with key media outlets after your release is sent. Check to see if they received the release, if they have any questions, and when they plan to run the release.



Media Lists

A good way to build your own media list is to contact your state Press Association. They have listings and contact information for small and large weekly and daily newspapers in your state. The phone book is another place to start—check the yellow pages for TV and radio stations. You may also want to think about including local natural resources groups and their newsletters—this may be a good target audience for your messages and events. And don't forget about the Internet! Many media outlets have websites that include some of their broadcast or printed material. The natural resources groups are likely to have websites as well and may include your information.

In today's electronic age, more media outlets prefer to receive news releases via e-mail rather than on paper. This enables them to take the information and quickly format it for use, rather than taking the time to manually re-enter the release. When assembling your media list, ensure that you include an e-mail address for each media contact. You may want to ask the contact which form of press release they prefer, paper or electronic.

News Conferences

Relationships are key, but the news itself is equally important. What makes something newsworthy enough to gain the media's interest? We've found news conferences to be effective in this respect. In addition to writing a news release about an upcoming event, research report, or accomplishment, we invite key project people to speak at a brief news

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conference. Occasionally we invite relevant public figures to participate as well - this builds media interest.



We generally schedule the news conference early in the day if we are primarily interested in broadcast coverage. If print is our main target, an afternoon news conference is fine, and media may have more unrestricted time later in the day. Write a release announcing the time, place, speakers, and general intent of the conference. In addition, write a detailed release that will be mailed after the news conference recapping what was announced or said at the conference. Since media are highly competitive, mailing a copy of the content of the conference rewards the media that care enough to cover you in person by allowing them to know the news first. For example, in the past we have saved our most newsworthy announcements about the Children's Groundwater Festival for our news conferences in order to reward those media representatives that care enough to attend.

Media Packets

You should consider using media packets at any larger event sponsored by your group where you expect media coverage. A media packet can be a great asset to a reporter covering your event. Since they are working on a deadline, the information included in the media packet saves them time and effort. Media packets should contain information that help the reporter get a good, thorough story. For our Children's Groundwater Festival, our packets for media covering the event include the Festival program; a fact sheet describing the history of the Festival, highlights of that particular year's Festival, special guests, attendance, etc.; activity schedules; and VIP guest schedules. You can tailor your packets to your event. While you want to be thorough, don't overload the reporter with excess information and materials. The reporter will appreciate your efforts to make their job easier.

We also assemble a media packet after the Festival with copies of newspaper articles about the event. These are nice to provide to volunteers, presenters, potential funders, and help us get ready for the following year!

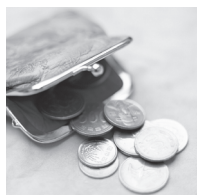


National Drinking Water Week

Another excellent opportunity for showcasing your work for the media occurs the first week in May each year during National Drinking Water Week. It is a great time to send news releases about how your work on behalf of source water is helping to protect public health. You might collaborate with a local water utility on a tour or public awareness seminar. This may also be another chance to utilize media packets profiling your activities, partners, and contacts to encourage coverage. And remember if you are not getting the attention you want, simply call them with the message the "It's National Drinking Water Week and an excellent time to schedule an interview!" Explain who you are and how your

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work is tied to National Drinking Water Week. The American Water Works Association has packets available to help you with issues and publicity. For more information visit www.awwa.org/advocacy/dww/ or call 303-347-6140.



Does it Pay to Advertise?

Using paid advertising or public service announcements (PSAs) can be ways to attract media attention. However, generally we have tried and failed at getting much attention through public service announcements. There is money involved for production and you never know when or where your messages will be heard. Of course, there are groups who have had a great deal of success with this type of “advertising” and we have had our own limited success. As a general rule, what you’re doing is so important that you shouldn’t have to rely on advertising.

At the 2001 Children’s Groundwater Festival, a local television station asked festival participants to submit ideas for groundwater PSAs. The station reviewed the submissions, then chose and produced three PSAs based on the kids’ ideas and even included the child in the PSA. Another successful venture was sponsoring “Groundwater Talk” on the University of Nebraska Football Network. Each year we also purchase a full-page ad in the *Grand Island Independent* after the Children’s Groundwater Festival to thank our volunteers, sponsors, and presenters. This has proven to be a good strategy because it not only helps promote our event, it also builds support in the community for the following year.

SECTION THREE: What to do When the Media Calls You

Successful Interviews

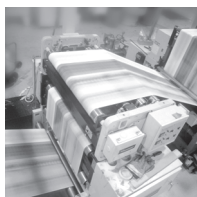
When the media get wind about the newsworthiness of your work, do not be surprised if they want to do an interview. Interviews are a great opportunity for you to spread the word and share your enthusiasm about your work with the public first-hand.

A successful interview requires a great deal of preparation on the part of the interviewee. Instead of jumping blindly into an interview, take the time to prepare yourself for what you will say. Learn about the audience who will read/see/hear your interview and think about the type of message you wish to convey to this group. What kind of knowledge would they most likely have regarding your issues? Next, decide the main points you want to communicate to your audience and get comfortable with the language you intend to use in explaining them. However, you don’t want to sound too rehearsed and stiff so try to be relaxed and use an extemporaneous speaking style. Don’t be afraid to talk with the interviewer prior to the interview itself. Contrary to what you may think, most interviewers are not out to “get you” and want a good interview as much as you do. Find

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out what kind of questions you should expect, when and where the interview will take place, how the interview will be conducted (over the phone, in person, live on the air, taped) and when the interview will be aired or printed. And don't be afraid to say, "I don't know." Offer to find out and get back to the reporter if they wish. Once again, building a relationship with the media will be a benefit to you when an interview is requested.

The nature of the interview also determines how you prepare for and handle it. An interview for use in print is much different than one that will appear on the 6 o'clock television news or the radio.



Print

When you are interviewed for a story to appear in print, you should be prepared to discuss your story in-depth. The reporter may or may not use the entire interview in the written article, so it is more important to repeat and emphasize your main points. Because newspapers, newsletters, and journals reach a broad range of people, you want to be mindful of the wide variety of readers. In addition, what you say should be easy to understand so it's easy to read.

A benefit of interviews for print is that you can use notes if you feel comfortable. This may help you focus your message and main points, as well as ensure that any facts and figures you refer to are correct. And always assume that everything you say is "on the record."

Television

Because television messages are seen as well as heard, it is important to focus on verbal and non-verbal cues. It is important that your body language and the manner in which you speak are consistent with what you are saying. Keep your voice in a normal conversational tone, but be energetic at the same time. The same is true of your posture. Position yourself comfortably, but lean slightly forward to appear involved and interested.

Remember that this is truly just a conversation between two people. Be conscious of your behavior, but let yourself be natural. Use gestures when accentuating your points if it feels natural to do so, but avoid nervous movements or those that look planned. In addition, make eye contact with the reporter. Avoid looking directly at the camera unless you are told to do so. And above all, stay calm. It is easy to get nervous in front of the camera, but try and pretend it's not there and you are just having a one-on-one conversation with the reporter.

Working with the Media

Television is a visual media, so your appearance can affect the messages you send to the audience. What you wear should be appropriate to the setting of the interview. If the interview takes place in a studio, your attire should be more formal, such as basic dresses or suits for women, and suits for men. You do not want your attire to be distracting, so simplicity is key. Avoid busy patterns and large, noisy jewelry. If you are in doubt about what to wear, simply ask.

It may seem as if the message itself is not that important with all of these other things to think about, but what you actually say is important. It is key to stay on track and keep your responses direct and to the point. It may be tempting to ramble at times, but this buries your main message. Always keep in mind what you want the audience to take away from the interview and craft your responses around this message.

Radio

Radio audiences are more targeted than television or print, simply because stations have particular formats that they follow. As a result, you will most likely be speaking to a specific group of people. Find out what the station's format is ahead of the interview and determine what type of audience will hear your interview and what kind of base knowledge they may have regarding the issues and messages you plan to discuss.

Many radio shows have an outline for their time allotted. It generally includes how long each segment will last, when and how long any breaks will occur, and may include what the host wishes to ask you. If you do not receive an outline prior to the interview, ask the host how they wish to handle the interview.

Because radio is an audio media, your vocal tone helps to keep the listener interested. Be energetic and talk in your normal conversational tone. Sound confident—the listener will develop an image based upon what they hear. And remember the power of the pause. Do not be afraid to let a second pass before you answer the interviewer's questions. This will prevent you and the interviewer from talking over each other. Finally, assume you are on-air from the time the program begins to the time it ends.



SECTION 4: Doing Your Own Thing

If you are willing to work hard, you can almost always get free airtime or print space. For example, Tom Cech and his staff at the Central Colorado Water Conservancy District produce a water “mini-page” to run in the local daily newspaper. They followed rule number one and developed a great relationship with local editors who then trusted them to

Working with the Media

write an engaging, informative page. The paper ran this free of charge because it was not only informative to their readers, but it saved the news staff an enormous amount of time and money.

The Groundwater Foundation has had similar success with a large, local CBS affiliate. We researched and produced, with their assistance, five different seven-minute segments called “Groundwater Discovery.” Each segment was aired sequentially, once a week, for five consecutive weeks at noon. The premise of “Groundwater Discovery” rested on viewers using materials in their own homes to discover the nature of groundwater (i.e. pantyhose became screens for wells represented by oral syringes; molding clay and potting soil became a wetland in a cake pan).



Take Action

Do not sit back and wait for the media to come to you. Take initiative on your own and make them notice you. Write your own articles and editorials for your local newspaper. Call a local TV or radio station and tell them what your team has been up to and why they should cover your work. It is important enough for them to notice!

ACTIVITY INSTRUCTIONS

All on the Wall

Objective:

to develop a list of protection strategies that will have the most impact on local source water supplies

**Materials:**

4x6 inch Post-it® notes
 markers (all the same color)
 a wall or other surface to display the notes (glass and dry erase boards work best)
 a dry erase board, chalkboard or flip chart to record (optional)
 masking tape (may be needed)

Time Needed:

at least 25 minutes

Set Up:

1. Count the number of participants you have and organize them into same-sized small groups. The groups should be no smaller than three persons and no larger than five. For example, if you had twenty participants, you could organize them into five groups of four or four groups of five.
2. Give every participant five sheets of the Post-it® paper and a marker.
3. Write the following question down on the dry erase/chalk board or flip chart. (If you do not have a board or flip chart, simply ask the question out loud. Make sure to repeat it until everyone is confident they understand the question.)

*If you and/or your community had no limitations
 (i.e. time, money, expertise, political support),
 what would you do to protect your community's drinking water source?
 Remember, the sky is the limit, so think big!!*

Activity Steps:

1. Ask everyone to write one response on each piece of paper to the question listed above. Make sure they use the paper and markers given to them and that they write big so their responses can be read when posted on the wall. Ask them to keep their responses one to five words in length. At this point ask them NOT TO SHARE THEIR RESPONSES WITH THEIR SMALL GROUP. Give everyone five minutes to come up with five responses. Ask them to turn their responses upside down on their table when finished.

ACTIVITY INSTRUCTIONS

All on the Wall



2. Make sure everyone is finished. Ask the groups to share their responses with each other and find out if people had similar ideas. Ask them to consolidate ideas where they can by attaching them to each other (in some cases, the group may create long strings of related responses). Then ask them to work as a group to narrow their responses down to their top ten. The groups should be able to consolidate and select their responses in five minutes.
3. Ask each group to choose a spokesperson. Have each spokesperson come up to the wall and report their protection strategies to the entire group. As they report each strategy, help the spokesperson post their team's responses on the wall (depending on the wall, you may need to use the masking tape to make the notes stick). Organize and categorize the strategies so similar strategies are together. If you like, the responses can be organized into a contaminant management grid with regulatory/voluntary and structural/nonstructural activities, similar to the Decision Grid activity on **Handout 5-2**.
4. After all the groups have posted their responses, ask if they were at all surprised by the groups' responses. Generally, even though participants were asked not to be constrained by reality, their responses are practical and realistic. Talk about why they think the strategies listed will protect their source water.
5. To discuss how these strategies may be implemented, move on to the Decision Grid activity.

ACTIVITY INSTRUCTIONS

Decision Grid

**Objective:**

to organize and prioritize the protection strategies developed in the “All on the Wall” activity and to identify next steps the group could take to implement a source water protection strategy

Materials:

protection strategies developed during the “All on the Wall” activity
 a dry erase board, chalkboard, flip chart or even sheets of paper and masking tape
 (anything you can use to create a large grid that everyone can see)
 appropriate writing utensil

Time Needed:

at least 25 minutes

Set Up:

1. Draw the following grid on the board:

		EFFORT	
		Difficult to Do	Easy to Do
IMPACT	Major Improvement		
	Minor Improvement		

ACTIVITY INSTRUCTIONS

Decision Grid

2. Explain to the participants that the object of this activity is to organize the strategies developed in the “All on the Wall” activity into the grid. The categories are:
 - ♦ Difficult to do but yields a major improvement
 - ♦ Easy to do and yields a major improvement
 - ♦ Difficult to do and yields a minor improvement
 - ♦ Easy to do but yields a minor improvement

Activity Steps:

1. Organize the strategies developed in the “All on the Wall” activity into the grid. Not everyone may agree about the impact or effort needed to implement an activity. The goal is to reach a consensus and get a better idea about the amount of effort needed to implement a given protection strategy.
2. When all the strategies are organized, reveal the strategies that are:
 - ♦ “Easy to do and yield a major improvement” should be the ones to focus on and implement first. The most productive long-term source water protection programs begin with a relatively quick and easy activity that has a direct and major impact on the resource. This early success will give the overall protection program momentum to generate additional financial and technical support.
 - ♦ “Easy to do but yield a minor improvement” should also be implemented at the beginning of a protection effort. Strategies that are easy to implement serve to mobilize support and draw attention to a community’s efforts.
 - ♦ “Difficult to do and yield a major improvement” should be the subject of detailed action planning. Recommend that the group begin to reach out and involve potential partners and support now with the understanding that it may take years to develop a comprehensive action plan to fully implement the strategy.
 - ♦ “Difficult to do and yield a minor improvement” should be discarded. The group’s time is better spent on strategies that have a major impact or are relatively easy to implement.
3. Now that they know where they should begin, urge the group to talk about next steps. Focus on the strategies that are “easy to do and yield a major improvement.” Use the Groundwater Guardian Result Oriented Action Planning Sheet to help them organize their thoughts into a concrete action plan. For a copy of the planning sheet, contact The Groundwater Foundation at 1-800-858-4844 or visit www.groundwater.org/gg/forms_comm.html.

ACTIVITY INSTRUCTIONS

Decision Grid

4. Before the participants leave the room, get them to commit to at least one action that will get them closer to implementing these strategies. For example, the group could schedule a follow-up meeting to continue to discuss protection strategies. If more information is needed about a particular strategy, ask someone to research it and report back to the group at the following meeting.

Committing to action at the end of this activity is the first step toward developing a source water protection plan and implementing protection activities.

ACTIVITY INSTRUCTIONS

Force-Field Analysis

Objective:

to identify potential resources and obstacles associated with implementing a source water protection program or strategy

Materials:

a dry erase board, chalkboard or flip chart
appropriate writing utensil

Time Needed:

at least 15 minutes

Set Up:

1. Write the following goal statement where everyone can see it.

My community will develop and implement a source water protection program.

The goal statement may also be written to focus on any one particular source water protection strategy (e.g. my community will develop and implement a household hazardous waste recycling program.)

2. Draw a line down the center of the board or flip chart.

**Activity Steps:**

1. On one side of the board or chart, identify all the items that will assist the community as it develops and implements its source water protection program. These items may include community attitudes, state or local resources, skills that individuals are willing to contribute to the protection effort.
2. On the other side of the board or chart, identify all the items that could hinder the community as it develops and implements its source water protection program. Be careful to end this step before it degenerates into a “gripe” session.
3. Discuss how the group can mobilize assistance and overcome possible hindrances. Discuss how sometimes assets can become hindrances and vice versa.

ACTIVITY INSTRUCTIONS

Sequential Questioning

Objective:

to gain a better understanding of the group's attitudes and beliefs about source water protection in their community

Materials:

flip chart
markers
questions (see below)

Time Needed:

at least 25 minutes

Set Up:

1. Write each of the following statements at the top of a piece of flip chart paper (one statement per piece of flip chart paper). Leave each sheet attached to the flip chart. Keep the statement covered until you are ready to discuss it. The statements are:
 - ♦ Source water protection is a priority in/for my community.
 - ♦ The average citizen in my community can identify the source of their drinking water.
 - ♦ Land, home and business owners/managers in my community understand how their decisions and behaviors impact their community's drinking water source.
 - ♦ A source water protection program should include both regulatory and voluntary activities.
 - ♦ My community is taking action based upon the findings of its source water assessment and other data that has identified potential and actual threats to our drinking water source. (This can also be phrased - my community is prepared to take action based upon the findings of its source water assessment and other data that has identified potential and actual threats to our drinking water source.)

To tailor the workshop experience to specific situations, develop your own statements about attitudes and conditions within a community.

Activity Steps:

1. Reveal the first statement. Ask one person in the group to respond "yes" or "no" to the statement. Record that person's response. Ask others in the group to add their thoughts and reactions as to whether they agree or disagree and why. Develop a summary statement about how participants feel about the statement.

ACTIVITY INSTRUCTIONS

Sequential Questioning

2. Repeat the process for the remaining statements.

Variation:

This activity could also be done in small groups. Prepare sheets with one statement at the top of each page. Hand out a set of sheets to each group. Give the groups five minutes to discuss each statement with one person from the group recording responses on the sheet. Then discuss as a large group the small groups' responses. Develop a summary statement about how participants feel about the statement.

SAMPLE

Written Survey



Please take a few minutes to provide comments in order to help improve this workshop.

- In your opinion, how useful was the information presented today? Check answer.
 - ☐ Extremely useful and relevant to local conditions
 - ☐ Useful and relevant to local conditions
 - ☐ Somewhat useful and relevant
 - ☐ Not useful or relevant to local conditions
- Would you encourage coworkers, neighbors and friends to attend a similar workshop? Check answer.
 - ☐ Yes
 - ☐ No, please explain: _____
- Please respond to the following statements using the ranking system provided. Place one "X" in the box that best reflects your opinion of the statement.

	Strongly Agree	Agree	Neutral Position	Disagree	Strongly Disagree
Presenter(s)					
a. The presenter(s) was/were well prepared.					
b. The presenter(s) got their message across clearly and logically.					
c. The presenter(s) met the stated workshop objectives.					
Materials/Activities					
d. The materials were well organized.					
e. The materials were helpful.					
f. The handouts were helpful.					
g. The small group activities were helpful.					
Facility					
h. The temperature of the room was comfortable.					
i. The presentation/screen was easily visible.					
j. The presenter(s) and participants were easy to hear and understand.					

SAMPLE

Written Survey

4. What did you like most about the workshop?

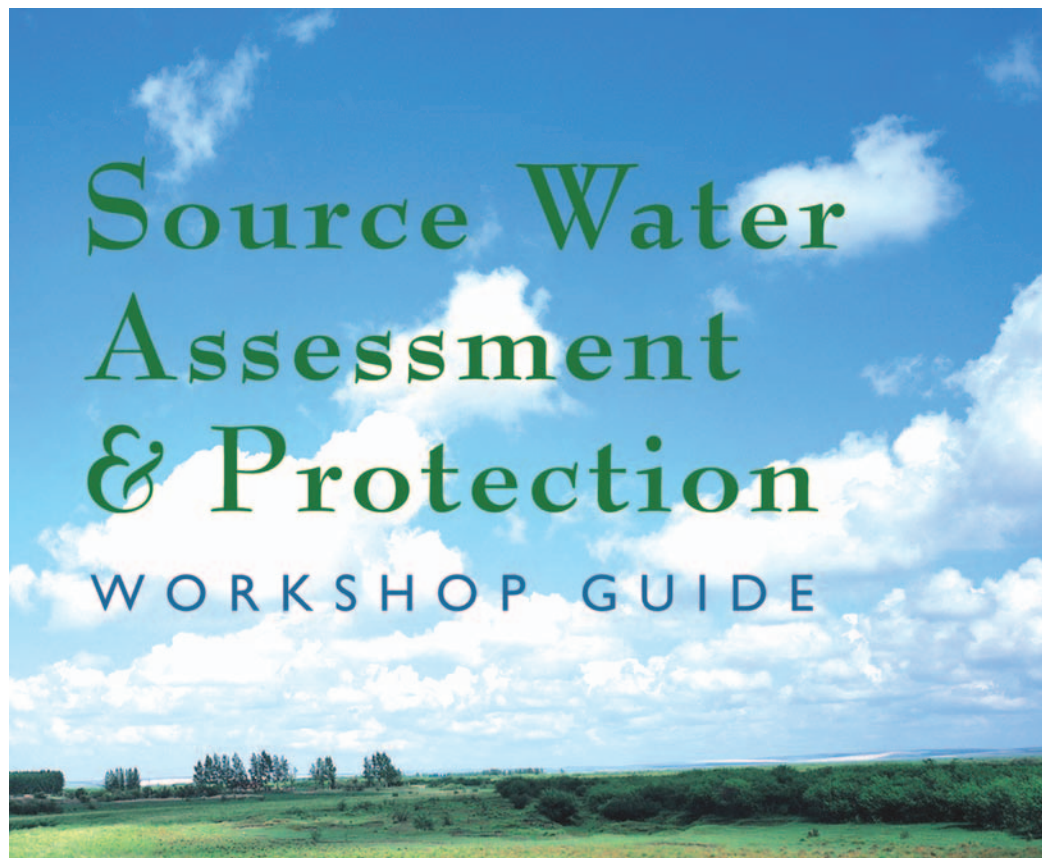
5. What did you like least about the workshop?

6. Do you have any suggestions for next steps (e.g. activities, meetings, workshops) that should be taken in this community?

7. Which of the following best describes your connection to your community's drinking water source? Check all that apply.
 - ☐ Business/Agricultural Consumer
 - ☐ Residential Consumer
 - ☐ Water-Related Professional
 - ☐ Other, please explain: _____

8. Which of the following best describes your role regarding your community's drinking water source and the surrounding area? Check the best answer.
 - ☐ Completely unfamiliar with such issues, unaware of threats, or do not feel any potential threats exist
 - ☐ Slightly involved and familiar, have read about and/or discussed some issues, but have not become actively involved
 - ☐ Involved and familiar, have studied and/or been actively involved with issues
 - ☐ Very involved and familiar, have studied issues in-depth and involvement is a priority

9. Other comments or suggestions:



**WORKSHOP PARTICIPANT MATERIALS
SECOND EDITION**

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The Groundwater Foundation is a nonprofit educational organization that has been actively promoting public awareness about groundwater issues since 1984. The Foundation's mission is to educate and motivate people to care about and for groundwater.

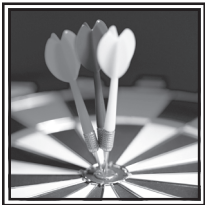
Table of Symbols

The following symbols have been included to identify items of particular interest. Their borders help set them apart from other graphics included in the workshop guide to create visual interest.



Workshop Participants

This material is written specifically for workshop participants and highlights an opportunity for your involvement in the source water assessment and protection process.



Major Point to Remember

Just like it says, this icon identifies information that you may want to tack up and remember as you get more involved in source water assessment and protection.

Part One

INTRODUCTION TO SOURCE WATER ASSESSMENT AND PROTECTION

Goal

To introduce definitions, historical information, and concepts as a foundation to understanding and getting involved in the source water assessment and protection process.

Welcome



Welcome to The Groundwater Foundation's

Source Water Assessment & Protection Workshop



Welcome to The Groundwater Foundation's source water assessment and protection workshop. This workshop is designed to provide community representatives such as yourself with information about a major initiative to protect the nation's drinking water - source water assessment and protection.

After attending this workshop, you will have the basic knowledge and resources to provide leadership in the source water assessment and protection process and share information about the source water assessment and protection process with others in your community.

This is your opportunity to see how your community can take advantage of, and get involved in, this national water education and protection effort!

Notes

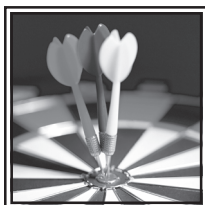
Protecting Drinking Water Sources

Assessments
lead to
PROTECTION

Communities
learn to
ACT



In **Part One** of this workshop, we will define source water assessment, source water protection and learn a little bit about the 1996 Safe Drinking Water Act Amendments, which is the federal legislation that inspired all this activity. Citizens, such as yourselves, must take an interest and learn how to get involved in order for the assessments to be utilized and lead to long-lasting source water protection.



Major Point to Remember

If you remember anything from this workshop, you should remember the difference between source water **ASSESSMENT** and source water **PROTECTION**:

Source water **ASSESSMENT** is required by law - it is the responsibility of state government. Source water **PROTECTION** is entirely voluntary - communities and citizens must work to make it happen.

Assessment is the process undertaken by state drinking water agencies on behalf of communities to help them learn about their drinking water and their drinking water source. Once sound, science-based information is gathered and understood, a community is better prepared to take action to protect their drinking water.

Source Water Assessment Process

Step One: Identify the Drinking Water Source

Step Two: Identify Sources of Potential Contamination



WHAT IS SOURCE WATER ASSESSMENT?

Source water assessment is a process of gathering information and processing data to learn about a community's source of drinking water. The information should tell residents where their water supply comes from and what conditions and/or practices *may* pose threats to its quality. This information can then be used to develop a plan or strategies to protect the community's water supply.

Notes

Source Water Assessment Process

Step Three: Assess How Susceptible the Drinking Water Source is to Contamination

Step Four: Make Assessments Available to the Public



Ideally, the assessment process brings together drinking water experts with locally-elected officials, the business community, agricultural producers, educators, and citizens. When a variety of people are actively involved in the assessment process, the community is better educated about their drinking water source and has the knowledge to protect it.

Drinking water experts at the state and local level, such as employees of your state environmental protection agency, public water supplier and/or health department, may have been charged with conducting the assessments and/or guiding communities through the source water assessment process. Contact these state and local officials for more information about your state's source water assessment program.

Notes

Source Water Protection

Contaminant Source Management:

Keeping Potential Contaminants Away from the
Drinking Water Source

Contingency Planning:

Establishing a Plan of Action in Case of an Emergency

SOURCE WATER PROTECTION INVOLVES TWO KEY COMPONENTS - BOTH ARE EQUALLY IMPORTANT:

1. **Contaminant Source Management** involves a community adopting strategies, programs, and laws to make sure that contaminants do not reach the drinking water source. The goal is to prevent contamination and maintain the quality of the drinking water source.
2. **Contingency Planning** is used to develop community-based alternative action plans for drinking water emergencies, contamination events, or water system failure. Contingency planning also includes planning for new or additional sources of drinking water to accommodate population growth and increases in demand.



An effective drinking water source protection program, if implemented, may be able to prevent the need for water treatment and/or the development of new water supplies. Consequently, protecting drinking water sources and preventing contamination could save a community from spending a great deal of money!

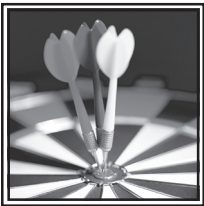
Notes

Source Water Protection

A lasting commitment to clean,
safe drinking water!



Source water protection is the lasting commitment to clean, safe drinking water. Without a lasting commitment, ideally established during the assessment process, chances are that no knowledgeable and interested group of citizens will be there to take the results of the assessments and translate them into effective, protective measures at the local level.



Major Point to Remember

Without a doubt, source water protection should be an extension of the source water assessment process and a direct result of citizens developing an understanding and a desire to protect the source of their drinking water.

Notes

Safe Drinking Water - The Early Years

State public health agencies fight water-borne disease beginning in the early 1900s

States adopt multiple barrier approach:

- ♦ Prevent or treat drinking water contamination
- ♦ Focus on treatment and distribution (cross-connection control)
- ♦ Routine sanitary surveys

In the early 1900s, state public health agencies began to protect sources of drinking water in response to widespread epidemics attributed to drinking water contamination from pathogens. By the mid-1900s, state public health departments were well-established regulatory agencies.

The state programs used a multiple barrier approach to prevent or treat drinking water contamination. The first barrier was the selection and protection of an appropriate source. For surface sources, this meant locating and constructing water intakes to ensure little or no contamination from fecal bacteria. For groundwater sources, this meant constructing wells in appropriate locations, at appropriate depths, and with approved construction methods (e.g. casing and grouting).



Other barriers included treatment (selected to be appropriate to the quality of the source water) and distribution (to promote the full circulation of water and avoid stagnant water conditions that might facilitate microbial contamination). The integrity of distribution systems was periodically checked to avoid any type of cross-connection whereby untreated or contaminated water might enter the system.

One method to implement the multiple barrier approach was to conduct routine sanitary surveys. Sanitary surveys require state sanitarians or engineers to inspect water systems and check all components of the system from source to tap. Sanitary surveys have identified numerous problems and potential problems, thereby preventing the contamination of source water.

For more information about the hazards of cross-connections, refer to the *Cross-Connection Control Manual* at www.epa.gov/safewater/crossconnection.html or *Potential Contamination Due to Cross-Connections and Backflow and the Associated Health Risks: An Issues Paper* at www.epa.gov/safewater/tcr/pdf/cross.pdf. For more information about the sanitary surveys conducted in your state, contact your state public health agency.

Safe Drinking Water Act

Passed in 1974 to protect the nation's drinking water quality



Authorized the USEPA to:

- ♦ Identify contaminants
- ♦ Establish drinking water standards and maximum contaminant levels (MCLs)

The **Safe Drinking Water Act (SDWA)** was first passed in 1974 to protect the quality of drinking water in the United States. This law focuses on all waters actually or potentially designated for drinking use, whether from above ground or underground sources.

The SDWA authorized USEPA to identify contaminants and to establish drinking water standards for public water supplies. All owners or operators of public water systems are required to comply with primary (health-related) standards. State governments, which assume this power from USEPA, also encourage attainment of secondary or aesthetic standards (nuisance-related standards, e.g. taste and odor). Standards are enforced by testing the water supplied by public water suppliers to customers and measuring samples against established maximum contaminant levels (MCLs). These standards apply to public water supplies only, but are also being used as guidelines to assess contamination of private wells.

For a current list of contaminants regulated under the SDWA and their MCLs, contact USEPA's Safe Drinking Water Hotline at 1-800-426-4791 or visit www.epa.gov/safewater/mcl.html.

This law established consistent standards for contaminants found in drinking water. The SDWA is credited with bringing about improvements in public health and standardizing water quality across many water systems; however, the emphasis in the law has traditionally been on monitoring and treatment, not maintaining quality through source water protection.

Safe Drinking Water Act

1986 Amendments to the Safe Drinking Water Act (SDWA):

Wellhead Protection

- ♦ Completely non-regulatory
- ♦ Directing federal dollars to areas most in need
- ♦ For small systems, prevention is much cheaper than treatment

Underground Injection Control

Sole Source Aquifer Designations

Wellhead protection has been promoted by the federal government since 1986 - long before the source water assessment and protection program was developed. Wellhead protection programs include provisions to protect the surface and subsurface areas around public drinking water wells and offers communities a cost-effective means of protecting vulnerable groundwater supplies. Wellhead protection is significant because the majority of water systems in the United States rely on groundwater as their source of drinking water.

According to *Factoids: Drinking Water and Ground Water Statistics for 2002* published by the USEPA, a total of 53,437 community water systems serve 267,722,666 people in the United States. Groundwater is the source for 78% of those systems (41,691). Most community water systems are small systems - 93% serve fewer than 10,000 people. While groundwater serves a majority of the community water systems, these systems serve only 20% of the total population. It makes more sense financially for the small systems to prevent contamination than to invest in massive infrastructure to treat it.



The 1986 amendments also initiated a more rigorous and rigid approach that brought many more contaminants under regulatory control. In addition, the SDWA authorized USEPA to regulate the underground disposal of wastes in deep and shallow (Class V) wells, and designate areas that rely on a single aquifer for their water supply. The rigid structure of the law and the continuing emphasis on monitoring and treatment made more revisions necessary.

For more information about the federal underground injection control program, visit www.epa.gov/safewater/uic.html. For more information about the sole source aquifer program, visit www.epa.gov/safewater/ssanp.html. For more information about both, contact USEPA's Safe Drinking Water Hotline at 1-800-426-4791.

Safe Drinking Water Act

1996 Amendments to the Safe Drinking Water Act (SDWA):

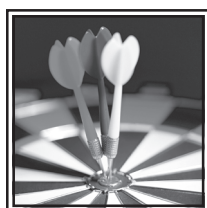


- ♦ Established a nationwide commitment to prevention and protection
- ♦ All source water assessments should have been completed by May 2003



In 1996, amendments to the Safe Drinking Water Act were adopted by Congress. The amendments reflected the nation's commitment to maintaining drinking water quality and preventing drinking water contamination before it occurs. The amendments required states to develop state-wide source water assessment programs, which were then approved by the USEPA. The amendments also required that source water assessments be completed for all public water systems by 2003.

Citizens can become involved now by doing what you are doing - learning about their source water assessment and strategies they may use to protect their source water. By gaining a valuable understanding about local source water resources, citizens will be better prepared to become involved and take action to protect their drinking water source!



Major Point to Remember

All source water assessments should have been completed by May 2003. Check with your state drinking water agency or local drinking water provider to find out if an assessment has been completed for your drinking water source.

Clean Water Act (CWA)

Regulates pollutant discharges from point sources, primarily through National Pollutant Discharge Elimination System (NPDES) permits.

Controls non-point source pollution for impaired waters by developing Total Maximum Daily Loads (TMDLs).

The Clean Water Act (CWA) serves to protect sources of drinking water by regulating discharges of pollutants into the waters of the United States. The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The CWA gave USEPA the authority to set effluent (i.e. liquid discharged as waste) standards on an industry basis and continued the requirements to set water quality standards for all contaminants in surface waters. The CWA has been reauthorized and added amendments in 1977 to focus on toxic pollutants and in 1987 to focus on toxic substances, citizen law suit provisions, and construction of sewage treatment plants.



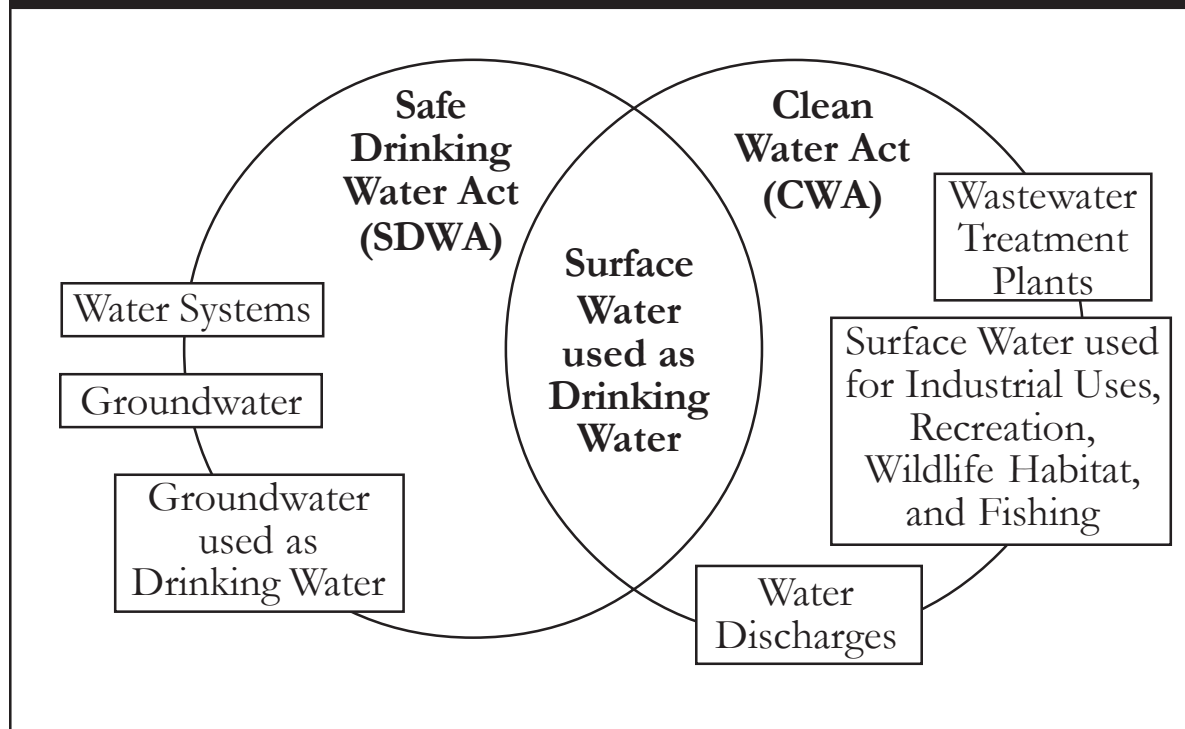
Major Point to Remember

The CWA makes it unlawful for any person to discharge any pollutant from a point source (i.e. pipes, outlets, or other conveyances) into navigable waters unless a National Pollutant Discharge Elimination System permit (NPDES permit) is obtained under the Act. Permits are not required, however, for nonpoint sources, which are pollutants diffused across a broad area so their contamination cannot be traced to a single discharge point. Examples of nonpoint source pollution include runoff of excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas; oil, grease, and toxic chemicals from urban runoff and energy production; and sediment from improperly managed construction sites, crop and forest lands, and eroding streambanks.



Under CWA Section 303(d), states are required to identify waters that do not meet water quality standards after the implementation of nationally required levels of pollution control technology, and to develop Total Maximum Daily Loads (TMDLs) for those waters. TMDLs are used to determine the maximum allowable amount of pollutants that can be discharged to impaired waters in a day. Based on this determination, pollutant loadings are allocated among pollution sources in a water segment. TMDLs also provide a basis for identifying and establishing controls to reduce both point and non-point source pollutant loadings. State lists that identify waters needing TMDLs, and TMDLs developed for specific water bodies, are a useful source of information for the development of source water assessments.

SDWA / CWA



The Clean Water Act (CWA) allows the USEPA to delegate many of the permitting, administrative, and enforcement aspects of the law to state governments. In states with the authority to implement CWA programs, USEPA still retains oversight responsibilities. For more information about the CWA, visit www.epa.gov/region5/water/cwa.htm.

The Safe Drinking Water Act (SDWA) and the CWA primarily intersect by addressing the quality of surface water used as drinking water. They may also intersect in those numerous cases where the quality of groundwater has a direct impact on the quality of surface water and vice versa.

For more information about how the SDWA and CWA both protect sources of drinking water, contact USEPA's Safe Drinking Water Hotline at 1-800-426-4791.

Notes

Public Involvement: A Continuous Theme

Required in:

- ♦ State assessment program development
- ♦ Making assessments available to the public

Encouraged in:

- ♦ Assessment process (e.g. contaminant source inventory)
- ♦ Development of local protection programs

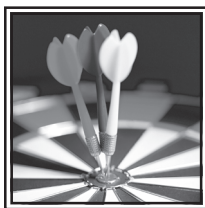


IMPORTANCE OF PUBLIC INVOLVEMENT

Public involvement is critical to source water assessment and protection, and the reason for this is simple. Everyone in a community needs water, uses water, and impacts water. No one is “exempt” from water management - we do it in our households and workplaces every day. How we choose to manage and interact with water, individually and as a community, is vital to maintaining and improving its quality as a source of drinking water.

As part of the 1996 amendments to the Safe Drinking Water Act, public involvement was required as part of the states’ source water assessment program development process and by making source water assessments available to the public. Although it is not a requirement, citizens can also get involved in conducting a community’s source water assessment. Citizen volunteers have been known to be especially useful in identifying potential sources of contamination in the community and adding information to susceptibility analyses. They are “out and about” and can be easily trained to look for certain substances and practices that can be identified as potentially harmful to drinking water sources. Citizens can also be involved in the development of local source water protection programs.

Building teams within communities is an excellent way to create a group of educated and committed citizens who work together to confront drinking water concerns. For more information about teams and team-building, contact The Groundwater Foundation at 1-800-858-4844 or visit www.groundwater.org.



Major Point to Remember

Citizens are critical when it comes to source water protection. When citizens support policies and programs to protect drinking water sources, decision-makers are more likely to implement those policies and programs.

Part Two

SOURCE WATER ASSESSMENT

Goal

To describe the source water assessment process requirements, as per the 1996 Safe Drinking Water Act (SDWA) amendments, United States Environmental Protection Agency (USEPA) guidance, and additional material.

Obtain a Copy of Your Local Assessment

Source water assessments must be made available to the public - **HOWEVER**, the sensitivity of this information means that availability varies widely.

A basic understanding of the information provided in a source water assessment is **CRITICAL** to source water protection.

While the 1996 amendments to the SDWA require significant new efforts to fully inform citizens about the source, quality, and potential threats to their drinking water, events since September 11, 2001 require that the disclosures of public information provide for the security of those same citizens. Information made available to the public as part of the source water assessment process should definitely take security concerns and potential threats to public water systems into consideration.



For individuals and groups interested in getting active in source water protection, an understanding of the information provided in the source water assessment is critical to their success. Make every effort to obtain a complete copy of your local source water assessment, but also respect local government's concerns about safety and security if a copy of the assessment is not all that easy to obtain.

Notes

Step 1: Identify the Drinking Water Source

Groundwater

- ♦ Arbitrary fixed radius method
- ♦ Calculated fixed radius method
- ♦ Analytical method (computer modeling)

Surface Water

- ♦ Fixed distance delineation method
- ♦ Time-of-Travel delineation method

Groundwater and Surface Water

SOURCE WATER ASSESSMENT PROCESS

STEP ONE: Identify the Drinking Water Source



Gaining an understanding of where your source water comes from is the first step toward protecting that resource. Identifying zones within a source water area may be used to target protection activities to those areas that have a more immediate impact on the source water.

GROUNDWATER

Where groundwater is the source of drinking water, the assessment must identify, or delineate, the wellhead area and other relevant areas where surface water percolates through the ground and replenishes groundwater (i.e. recharge areas), even if they are not directly adjacent to the well.

To delineate a groundwater source of drinking water, concentric circles may be drawn around a well to give people an idea of where contamination would be most likely to reach the well. This delineation method, called the **arbitrary fixed radius method**, is fast, inexpensive, and requires little technical expertise; however, because it does not consider physical/geological features or groundwater movement, it is more like an estimate of where the recharge area is, rather than an exact delineation.



A more precise delineation method, the **calculated fixed radius method**, considers groundwater flow, soil conditions, geology, and the physical processes of contamination. The calculated fixed radius method identifies “time-of-travel” zones to represent the amount of time it would take for a contaminant to reach the well if pumping stayed at current levels. Where time, money, and technical expertise is limited, the calculated fixed radius method may be used as an effective starting point for source water protection efforts.

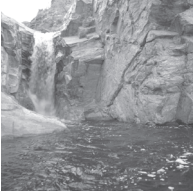
A more precise delineation method uses computer models and a variety of data points (e.g. aquifer thickness, water table gradient, groundwater direction of travel) to delineate the source of drinking water. These **analytical method delineations** are more expensive, but not prohibitively so, and should be conducted by a qualified professional. State environmental protection agency personnel, Rural Water Association technicians, conservation district personnel, private consultants and/or U.S. Geological Survey professionals are generally among those qualified to delineate a drinking water source using computer models.

Using different delineation methods significantly impacts how a groundwater recharge area will appear on a community’s assessment map. In some cases, a recharge area may first be delineated using the fixed radius method, and then delineated using an analytical method. It is very important that the difference between the two methods be clearly understood, especially when the differences have a significant impact on how protection area boundaries are determined.

SURFACE WATER

Where surface water is the source of drinking water, the assessment should delineate the entire surface water area above where water is withdrawn or diverted to the public water supply system.

Surface water areas, or watersheds, may be delineated relatively easily by using a topographic map to identify drainage channels and runoff patterns upstream of the drinking water intake. Watershed boundaries may then be identified by locating the divides between drainage basins. Specific conditions that influence the movement of surface water within the watershed should be identified by a qualified professional, such as those mentioned earlier.



While the entire watershed upstream of a drinking water system intake needs to be delineated up to the state's borders, a state can identify areas within the watershed as being more critical to protecting the water supply. To give people a general idea of where runoff is most likely to reach a surface water source, a **fixed distance delineation method** may be used. This is similar to the arbitrary fixed radius method in that it is relatively easy to do.

Surface water delineations can also be done in a way that identifies time-of-travel zones. Stream flow data is needed to determine the time-of-travel zones for this delineation method.

GROUNDWATER AND SURFACE WATER COMBINED

Where groundwater and surface water both serve as a community's source of drinking water or where groundwater is under the direct influence of surface water or vice versa, special relationships must be recognized and a comprehensive assessment of all sources conducted.

BOUNDARY LINES

Often sources of drinking water encompass a variety of political jurisdictions. When recharge areas and watersheds include more than one state, county, or city, governments must work together to assess and protect the drinking water source. Multi-state agreements or nonprofit organizations can be used to coordinate and implement multi-jurisdictional assessment and protection programs.

Notes

Step 2: Identify Potential Contamination Sources

Assessments must identify sources of:

- ♦ Contaminants with a USEPA-established maximum contaminant level (MCL)
- ♦ The microorganism *Cryptosporidium*
- ♦ Contaminants regulated under the Surface Water Treatment Rule

States may also identify additional sources of contaminants, such as sources of currently unregulated viruses, that may be regulated in the future.



STEP TWO: Identify Potential Contamination Sources

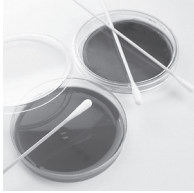
A source water assessment is required to identify all significant potential sources of contamination by regulated contaminants. Significant potential sources include:

- ♦ Contaminants with a USEPA-established maximum contaminant level (MCL),
- ♦ Sources of the microorganism *Cryptosporidium*, and
- ♦ Sources of contaminants regulated under the federal Surface Water Treatment Rule.

MCLs are the highest limits allowed of particular substances in public water supplies. To obtain a list of contaminants with a USEPA-established MCL, contact USEPA's Safe Drinking Water Hotline at 1-800-426-4791 or visit www.epa.gov/ogwdw. Individual states may add other potential contaminants to this list. For more information about the listed contaminants in your state, contact your state drinking water agency.

Cryptosporidium is a microbial pathogen that is resistant to traditional drinking water disinfection practices. In 1993, *Cryptosporidium* caused 400,000 people in Milwaukee to experience intestinal illness. For more information about *Cryptosporidium* and its potentially severe impacts on persons with severely weakened immune systems, contact USEPA's Safe Drinking Water Hotline at 1-800-426-4791 or visit www.epa.gov/safewater/crypto.html.

The purpose of the Surface Water Treatment Rule is to prevent waterborne diseases caused by viruses like *Legionella* and *Giardia lamblia*. These disease-causing microbes are present at varying concentrations in most surface waters. The rule requires water systems to filter and disinfect water from surface water sources to reduce the occurrence of unsafe levels of these microbes.



USEPA encourages states to inventory additional sources of contaminants that are not federally regulated at present but will be in the future. Those additional sources of contamination include pathogenic viruses and bacteria which will be addressed under the federal Ground Water Rule.

The Ground Water Rule will require public water systems to provide drinking water free from all fecal contamination, including e-coli bacteria. Public water systems may find that disinfection is the most cost efficient method for meeting this requirement, however, states may allow public water systems to comply with the Ground Water Rule through specific source water protection and infrastructure practices, such as a fully implemented wellhead protection program, regular sanitary surveys and cross-connection controls.

Notes

Step 2: Identify Potential Contamination Sources

Methods to Identify Potential Sources of Contaminants:

- ♦ Database Search
- ♦ Windshield Survey
- ♦ Site Visits with One-on-One Interviews



Clearly should focus on known sources of contamination and problem areas.

Contaminant source inventories may start with a **search of existing databases** to identify the type and quantity of potential contaminants that have been documented to exist in the delineated source water area. In many cases, those databases exist as part of a federal program to monitor and manage volatile or hazardous substances (refer to **Part One** of this workshop guide). These programs include, but are not limited to, the following:

- ♦ National Pollutant Discharge Elimination System (NPDES)
- ♦ Resource Conservation Recovery Act (RCRA)
- ♦ Superfund Comprehensive Emergency Response Cleanup and Liability Act (CERCLA)
- ♦ Superfund Amendments and Reauthorization Act Title III (SARA Title III)
- ♦ Underground Injection Control

The state agencies responsible for collecting and updating these databases vary from state to state. In general, the following state agencies and/or departments could provide valuable contaminant source inventory information:

- ♦ State environmental protection agency
- ♦ State health department
- ♦ State fire marshal
- ♦ State agriculture department
- ♦ State agencies that manage natural resources, such as oil and gas, water, soil, etc.

The entity responsible for conducting the state database searches will also vary from state to state.



To verify and update the database search, the contaminant source inventory should be ground-truthed. A simple way to ground-truth the contaminant source inventory is to conduct a **windshield survey** by driving or walking around the source water area and recording all the potential contaminants that are seen there. A more comprehensive method includes making a site visit to any facility or area that may use or produce contaminants of concern. Here citizens are encouraged to get involved as volunteers to conduct the interviews and record the information from **site visits**. For larger areas, such as entire watersheds, the on-site inventory can concentrate on known areas of concern first and then become more detailed.

The following potential pollutant sources should be identified in a contaminant source inventory*:

- ◆ Sewage Disposal - Wastewater discharges (municipal, industrial), wastewater collection systems (pump stations, collection system), on-site sewage disposal (septic tanks/drain fields)
- ◆ Urban Runoff - Combined sewer overflows, landfills, land development
- ◆ Industrial Runoff - Permitted discharges, accidents and spills
- ◆ Animal Population - Feed lots, dairies, grazing
- ◆ Agricultural Runoff - Manure, sludge application, pesticide/herbicide application, soil disturbance and runoff
- ◆ Forestry, Soil Disturbance Runoff - Logging impact, forest fires
- ◆ Recreation - Body contact recreation, non-body contact recreation (camping, equestrian, off-road vehicles, etc.), waste disposal relating to boating and fishing
- ◆ Mine Runoff
- ◆ Solid and Hazardous Waste Disposal and Storage Facilities
- ◆ Traffic Accidents/Spills
- ◆ Saltwater Intrusion (a concern for systems in coastal zones)

*This list does not include all of the various potential pollutant sources that may be found in a community. For more information about potential sources of contamination, contact your state environmental protection agency and/or your local health department. They may be able to provide you with a list of contaminants generally found in your area.

Step 2: Identify Potential Contamination Sources

Using Technology to Identify Potential Contamination Sources:

- ♦ Information Technology is Generally Available - You Just Have to Ask
- ♦ Information Technology is Relatively Cheap
- ♦ Volunteers Can Learn How to Collect Data Fairly Quickly - Someone with GIS Experience is Needed to Compile and Manage the Data
- ♦ Public Education is the Key to Success



Conducting a contaminant source inventory can be as simple as walking through a well-head protection area and making note of potential contaminants on a notepad, or as technically sophisticated as georeferencing sites of potential contaminant sources in a Global Positioning System (GPS) receiver and later exporting them into a Geographic Information System (GIS). The amount of technology used is dependent upon the availability and affordability of equipment and software to the user. A community's use of technology will also depend upon how the community intends to analyze and use the data collected in a contaminant source inventory, notify the public of the information derived from the inventory, and update and maintain the inventory in the future.



In 2002 The Groundwater Foundation conducted the Applying Community Technology Today (ACTT) project to identify and test technologies that could be useful to small communities interested in minimizing drinking water threats. A primer, *Using Technology to Conduct a Contaminant Source Inventory: A Primer for Small Communities*, reviews the technologies tested and offers lessons learned during the project. To obtain a copy of the primer, contact The Groundwater Foundation at 1-800-858-4844 or visit www.groundwater.org/pe/actt/actt.html. A summary of the lessons learned from the project are:

- ♦ **Information technology is generally available—you just have to ask to use it:** A small community may borrow the technology to conduct a contaminant source inventory from a variety of local partners, including other local or county government agencies, universities, or nonprofit organizations. Often this technology is readily available, but is not being used to manage information about potential contaminants located in a source water area.



- ♦ **Information technology is relatively cheap:** A small community may purchase the technology to conduct a contaminant source inventory at a relatively low cost, especially if it partners with organizations, such as educational institutions, that receive discounts.
- ♦ **Volunteers can learn how to collect contaminant source inventory data fairly quickly, but someone with GIS experience is needed to compile and manage the data:** Individuals with little or no experience using GPS and GIS can learn to collect contaminant source inventory data in a relatively short time. Someone trained to use GIS will need to compile the data, produce maps and database reports, and manage and update the database as new information becomes available.
- ♦ **Public education is the key to success:** Public education prior to, during, and following a contaminant source inventory is very important. The public should understand why and how an inventory is being conducted, how they can take part in conducting an inventory, and the results of the inventory. The maps produced by GIS are an excellent educational tool and can clearly show the public existing and potential risks to their drinking water source.

Step 3: Determine Susceptibility

The Assessment should determine

“The potential for a public water system to draw water contaminated by inventoried sources at concentrations that would pose concern.”

- USEPA Assessment Guidance

Each state must determine the susceptibility of all public water systems in the state.



STEP THREE: Determine Susceptibility

A susceptibility assessment evaluates how vulnerable the public water supply system is to contamination. A susceptibility assessment will assist the community in determining which potential contaminant sources pose the most concern to water quality. At the very least, the assessment should determine the potential for the public water supply to draw water contaminated by inventoried sources at concentrations that would pose concern. With this information, management priorities can be established for a source water protection program.

Notes

Step 3: Determine Susceptibility

- ♦ Analyze hydrology and hydrogeology
- ♦ Understand the characteristics of potential contaminants and how they could move to reach the drinking water source
- ♦ Understand the characteristics of storage facilities that contain and land uses that may expose potential contaminants



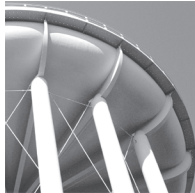
To complete a comprehensive susceptibility assessment, qualified professionals will need to:

- ♦ Analyze the area's hydrology or hydrogeology,
- ♦ Understand the characteristics of potential contaminants and how they could reach the drinking water source,
- ♦ Understand the characteristics of storage facilities and other sources that contain or could release potential contaminants,
- ♦ Evaluate the effectiveness of existing prevention and clean-up programs, and
- ♦ Assess the integrity of groundwater wells and surface water intakes.

Each state will need to come up with its own precise definition of susceptibility to use in their assessment program. A susceptibility assessment should help the community determine which potential contamination sources are priority concerns for the water system and therefore priorities for management in a source water protection program.

Step 3: Determine Susceptibility

- ♦ Evaluate the effectiveness of existing pollution prevention and clean-up programs



- ♦ Assess the strength and stability of the public water system by determining the integrity of wells and intakes

Ideally, contaminants could be ranked to clearly identify potentially high risk contaminants and facilities that need to be targeted for management right away. Such potentially high risk contaminant sources include underground storage tanks and waste disposal sites, which are often already under some type of monitoring program. Medium and low level threats, such as seasonal run-off and recreation waste, will still need to be addressed, but perhaps after the high level threats.

Notes

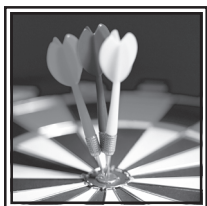
State Source Water Assessment Program

Purpose:

Generate assessments detailed enough to develop source water protection programs.

HOW GOOD DO THE ASSESSMENTS HAVE TO BE?

The assessments prepared by the states should be good enough to lead to the protection of drinking water sources. Source water assessments in general and susceptibility assessments in particular should be made easy for citizens and decision-makers to use and understand, yet detailed enough to be valuable to those needing information to protect sources of drinking water in their community. Ideally the assessments should be linked to existing or future wellhead and watershed protection programs.



Major Point to Remember

Communities should double-check the information provided in a source water assessment before they begin developing a source water protection program.

Step 4: Make Available to the Public

- ♦ Consumer Confidence Reports (published annually)
- ♦ Water Bill Stuffers
- ♦ Public Meetings
- ♦ Traditional Media Outlets - press releases, newspaper articles, news conferences, public service announcements, radio, television, news, posters, flyers, brochures



STEP FOUR: Make Source Water Assessments Available to the Public

The 1996 SDWA amendments require that easy-to-understand source water assessments be made available to the public in a timely manner to fully inform citizens about the source, quality, and potential threats to their drinking water source. However, in light of the events of September 11, 2001, federal, state and local governments must make sure that the disclosure of this information also provides for the security of those same citizens.

The most obvious entity who should be responsible for making the assessments available to the public is the entity who conducted the assessment. If the entity is a state agency, it should cooperate with a local entity to “get the word out.”

In most cases, the most likely local entity to make the assessment available to the public is the local public water supplier. Public water suppliers are already required to distribute a consumer confidence report to all their customers on an annual basis. A summary of the system’s source water assessment must be included in the consumer confidence report. This summary must include the source and general location of a system’s water supply. For a surface water system, naming the water body where the intake is located would suffice. For a groundwater system, naming the principle aquifer from which the source water was drawn would suffice. Systems serving 100,000 or more persons must maintain a current consumer confidence report on a website.

Step 4: Make Available to the Public

“Up and Coming” Media Outlets

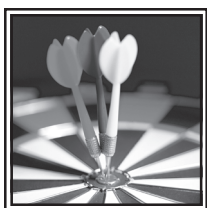
- ♦ Cable access television
- ♦ Websites

Educational Events - Festivals and Fairs

- ♦ National Drinking Water Week

USEPA goes on to suggest that public water suppliers publicize the availability of the assessment reports, send the results to all customers in bill stuffers, and include more detailed information as part of their annual consumer confidence reports. Public water suppliers are also encouraged to conduct additional outreach and education efforts.

Although consumer confidence reports are the logical first choice, source water assessments should be publicized through additional outlets such as water bills, press releases, public meetings, newsletters, cable access television, posters, flyers, and the Internet.



Major Point to Remember

Ideally, a community's source water assessment publicity effort will be part of a comprehensive public education and outreach effort, sponsored by a team of community representatives.

Part Three

SOURCE WATER PROTECTION

Goal

To define and provide an overview of the two major components of source water protection - contaminant source management and contingency planning.

Source Water Protection is...



Contaminant Source Management

- ♦ Keeping Potential Contaminants Away from a Drinking Water Source

Contingency Planning

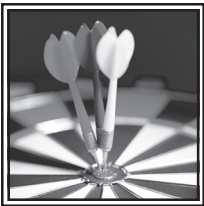
- ♦ Establishing a Plan of Action in Case of an Emergency

BASICS OF SOURCE WATER PROTECTION

Sources of drinking water are generally protected through two major components, both of which are equally important to protecting the resource. The two major components of source water protection are contaminant source management and contingency planning.

Contaminant source management involves a community adopting strategies, programs, and laws to keep potential contaminants away from a drinking water source. Contaminant source management strategies can be voluntary, regulatory, structural, and/or non-structural.

Contingency planning is used to develop community-based alternative action plans for drinking water emergencies, contamination events, or water system failure. Contingency planning also includes planning for new or additional sources of drinking water to accommodate population growth and increases in demand.



Major Point to Remember

To truly protect a community's source of drinking water, contaminant source management plans and contingency plans should both be in place.

As with source water assessment, the primary goal of efforts to protect sources of drinking water is to provide the community, now and in the future, with an adequate supply of high-quality drinking water.

A community embarking on the development of a source water protection program should further refine their goals to include specific, measurable, and achievable objectives. These objectives could include measures to:

- ♦ Minimize impervious areas (paved surfaces or rooftops) to preserve groundwater recharge and source water protection areas
- ♦ Provide an equitable sharing of the costs and benefits of protecting water supplies
- ♦ Protect water supplies from adverse effects of urbanization
- ♦ Preserve open-space land for aesthetics and recreation while also preserving land for water supply protection

Often plans to protect drinking water sources can be developed to correspond to and support programs, policies and goals already established within the community, such as those outlined in comprehensive plans, economic development plans, transportation plans, and recreation plans. These protection plans have a greater likelihood of gaining support than those that do not take into consideration existing plans.



Protection of drinking water sources is an extension of the government's police power, included under the government's power to protect public health, safety, and general welfare. The state delegates this power to local governments through enabling legislation. To protect groundwater at the local level, communities need to:

1. Identify whose responsibility it is to protect sources of drinking water,
2. Get the public involved, and
3. Base delineations and protection plans on sound science.

Mandatory programs developed to protect sources of drinking water must clearly focus on the areas of greatest importance.

Source Water Protection safeguards...

Public Health - by reducing risks of both acute and chronic ailments



Economic Well-being of Communities - because less polluted water is less expensive to treat

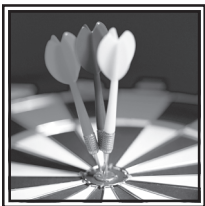
Source water protection is in the best interest of all people because it safeguards both the public health and economic well-being of communities.

Source water protection benefits public health because preventing the contamination of drinking water supplies should result in reduced risk to human health from both acute (i.e. rapid onset) and chronic (i.e. long term) ailments. Although most people experience only mild illnesses from waterborne microbes, pathogenic organisms such as *Cryptosporidium* and some strains of *E. coli* can be transmitted to people through drinking water and cause serious illness or even death.



In addition to threats posed by microbial contaminants, other substances can contaminate water supplies. Metals, volatile organic carbons, synthetic organic chemicals, and pesticides can cause serious health problems for persons exposed to them over long periods of time at levels exceeding health-based drinking water standards. Potential health effects of long-term exposure to these pollutants include cancer, birth defects, and organ, nervous system, and blood damage.

Source water protection benefits the economic well-being of communities because less polluted water is less expensive to treat.



Major Point to Remember

Studies have shown that the cost of dealing with contaminated groundwater supplies for the communities studied is, on average, 30 to 40 times more (and up to 200 times greater) than preventing their contamination.

Costs of Source Water Contamination

Quantifiable Costs - treatment and remediation, finding and replacing water supplies, public information campaigns, regulatory compliance, loss of property value and tax revenue

Other Less Quantifiable Costs - health costs, lost productivity, lost economic development opportunities, lost consumer confidence



The benefits to communities of protecting their drinking water supplies might best be understood by describing the costs of failing to protect them. These costs include those that are relatively easy to capture in monetary or economic terms and those that are not.

Easily quantifiable costs of drinking water supply contamination include:

- ◆ Treatment and remediation;
- ◆ Finding and developing new supplies and providing emergency replacement water;
- ◆ Abandoning a drinking water supply due to contamination;
- ◆ Paying for consulting services and staff time;
- ◆ Litigating against responsible parties;
- ◆ Conducting public information campaigns when incidents arouse public and media interest in source water pollution;
- ◆ Meeting the regulations of the Safe Drinking Water Act, such as the disinfection byproduct and monitoring requirements; and
- ◆ Loss of property value or tax revenue.

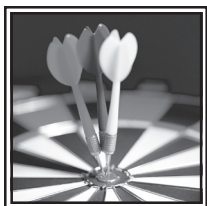
Costs that are not easily quantified include:

- ◆ Health related costs from exposure to contaminated water;
- ◆ Lost production of individuals and businesses, interruption of fire protection, loss of economic development opportunities; and
- ◆ Lack of community acceptance of treated drinking water.

Costs of Source Water Protection

Vary widely from community to community - basically the costs of source water protection are up to you!

The cost to an individual supplier or community greatly depends on the types of source water protection strategies it chooses to implement. Source water protection strategies can be relatively simple and inexpensive (such as public education programs) or expensive (such as purchasing land or easements). Program costs include staffing; program planning, development, and administration; land or easement purchases; and structural management measures. For example, constructed management devices such as wetlands and retention basins can cost approximately \$100,000 for a 50-acre site, plus the value of the land they occupy. Housekeeping measures (i.e. street sweeping) cost public works departments various amounts depending on the frequency at which they are performed.



Major Point to Remember

These costs may vary greatly from community to community and place to place, and will depend on such factors as the value of real estate in a particular area and the measures the community selects to protect its water supplies.

The United States Environmental Protection Agency (USEPA) studied the contamination and prevention costs to six small- and medium-sized communities that experienced contamination of their groundwater supplies and subsequently developed a wellhead protection program. The study showed that:

- ◆ Costs of source water contamination included costs of remediation activities, replacing water supplies, and providing water.
- ◆ Protection costs include basic program costs for delineating a protection area, identifying potential sources of contamination, developing an initial management plan, and planning for alternative water supplies and other responses in case of an emergency. (Much of this work should have been completed as part of the source water assessment.)
- ◆ The ratio of the benefits of avoiding contamination to the costs of the wellhead protection programs ranged from 5 to 1 to 200 to 1.

Comparing the costs of contamination to the costs of protection reveals that protection programs are generally well worth the cost and effort as an effective “insurance” against contamination and its associated costs. If you add the considerable quality of life benefits that are potentially provided by a source water protection program, the program may prove to be a bargain.

Contaminant Source Management

	Regulatory	Voluntary
Structural	Regulation of Underground Storage Tanks	Buffer Strips
Non-Structural	Consumer Confidence Reports	Volunteer Monitoring



SOURCE WATER PROTECTION THROUGH CONTAMINANT SOURCE MANAGEMENT

Contaminant source management is made up of strategies to keep potential contaminants physically away from the drinking water source. The goal is to prevent contamination before it occurs and maintain the quality of the drinking water source.

Contaminant source management, by its very nature, especially as it relates to groundwater, is a locally sensitive project. The complex interface of such factors as soil type, water table levels, geology/hydrogeology, existing land uses, and local priorities means that management strategy goals will vary from community to community.

In general, contaminant source management strategies can be described as regulatory - required by law, or voluntary - not required by law, but often encouraged through financial incentives and education programs. Strategies can also be described as structural - built structures or devices that control or contain contaminants, or non-structural - programs, policies and procedures that educate and/or guide individual or group activities that have an impact on water and drinking water quality.

Notes

Regulatory Strategies

Zoning - directs future development

Overlay Zoning Districts - take a zoned area and add another layer of zoning regulations to it



REGULATORY CONTAMINANT SOURCE MANAGEMENT STRATEGIES

Regulatory contaminant source management strategies require local and state governments to develop policies and programs and pass legislation to protect drinking water sources and other natural resources. Local governments generally protect groundwater and surface water sources of drinking water from contamination by using a variety of tools, such as zoning, health regulations, subdivision controls, and transfer of development rights. The ordinances, regulations and bylaws associated with these tools are being used to regulate on-site wastewater treatment systems; to place limitations on the use of toxic and hazardous materials, pesticides, and salts; to limit nitrogen loading within wellhead protection areas; and to prohibit certain uses within wellhead protection areas, such as landfills and underground fuel storage tanks.

ZONING

All states have zoning enabling legislation, although not all legal subdivisions (counties, cities) have approved zoning ordinances. For example, counties in Nebraska have historically opted not to adopt zoning ordinances. Today this situation has changed, with most Nebraska counties now adopting zoning ordinances to regulate the construction of confined animal feeding operations.

Zoning as a tool is most useful in directing future development. Zoning is not useful in changing current and existing development. Pre-existing land uses are generally grandfathered or exempt from regulation unless changes in land use are proposed.

OVERLAY ZONING DISTRICTS

Overlay zoning districts take an area that is already zoned and add another layer of zoning regulations to that specific land area. To create an overlay zoning district for source water protection, a scientifically sound delineation of the source water protection area must be conducted. Each district's regulations may be tailored to minimize the contamination potential of certain known contaminants in the area.

Regulatory Strategies

Overlay Zoning Districts may utilize:

- ♦ Land use controls
- ♦ Subdivision regulations
- ♦ Special permitting
- ♦ Performance standards (construction and operating standards)
- ♦ Growth controls



Overlay Zoning Districts may utilize:

- ♦ **Land Use Controls** - Land use controls may be used to target activities that use dangerous substances or that target the substances themselves. Some examples of substance-specific land use controls are prohibiting gas stations in sensitive areas, requiring double-hulled or corrosion-resistant underground storage tanks in sensitive areas, requiring minimum setbacks for on-site wastewater treatment systems, or requiring regular maintenance and inspection of on-site wastewater treatment systems.
- ♦ **Subdivision Regulations** - Subdivision regulations govern the process by which individual lots of land are created out of larger tracts and are intended to ensure that subdivisions are appropriately related to their surroundings. Some examples of subdivision regulations are those that govern the siting of on-site wastewater treatment systems and storm water infiltration structures to ensure they do not contaminate groundwater and protect aquifer recharge areas and manage drainage (e.g. using erosion control structures) to ensure that runoff does not become excessive as the area of paved surfaces increases.
- ♦ **Special Permitting** - Special permitting may be used to restrict uses within certain areas where they may cause contamination if left unregulated. Regulations ensure that extra attention is paid to the property. When certain precautions are taken, these particular uses should not pose a threat to the water supply.
- ♦ **Performance Standards** - Performance standards may be used to establish a threshold beyond which the impact of a use or activity is unacceptable. The threshold must be scientifically sound and set a standard to limit the impact of allowable land uses. Monitoring and enforcement are necessary to ensure the standards are met consistently over time. TMDLs (total maximum daily loads) are an example of a performance standard used to monitor surface water quality. Regular on-site wastewater treatment system inspection and maintenance and leak detection systems for underground storage tanks are examples of performance standards used to safeguard and monitor groundwater quality.
- ♦ **Growth Controls** - Growth controls time the occurrence of development by enforcing predetermined standards for water quality. The level to which development can maintain an established level of water quality dictates development.

Regulatory Strategies

- ◆ Health Regulations
- ◆ Permitting
- ◆ Inspections
- ◆ Stormwater Management

HEALTH REGULATIONS, INSPECTIONS, AND PERMITTING

Generally health regulations are administered by local health departments and concentrate on specific contaminant sources to reduce their impact on public health. Health regulations often are used to regulate underground storage tanks, on-site wastewater treatment systems, and floor drains. Health regulations are largely seen as a common sense approach to contaminant source management and therefore, are more acceptable to local governments; however, the costs of administering health regulations may be a concern for them.

Municipalities may require owners or operators of facilities that may pose a threat to source water to obtain permits to operate. Permits allow authorities to maintain an inventory of potential contaminant sources, periodically inspect facilities for compliance with ordinances, and require minimum construction or operating standards. Permitting may even be used to monitor the growth of potentially hazardous activities and their impact in a protected area. Permitting fees can help recover the costs associated with tracking and maintaining source-specific information.

Inspections may be used to regularly monitor known uses of potential contaminants to make sure they are being managed properly. Inspections can be conducted for critical watershed and recharge areas, septic system upgrades, and the handling of toxic and hazardous materials.



For some municipalities stormwater runoff may be a potential source of contamination. Large municipalities (i.e. with populations over 100,000), large public complexes, and highway agencies are required to get a National Pollution Discharge Elimination System (NPDES) permit and develop stormwater plans and programs to manage stormwater runoff. For more information about the federal stormwater regulations, visit www.epa.gov/npdes/stormwater/swphases.cfm. For more information about the contaminant source management strategies that may be included in stormwater management plans, refer to the Association of New Jersey Environmental Commission's resource paper, *Municipal Options for Stormwater Management*, at www.anjec.org/pdfs/stormwtr.pdf.

Voluntary Strategies

- ♦ Land Acquisition - Donations, Purchase (Market Value Transactions)
- ♦ Conservation Easements
- ♦ Limiting Development - Cluster/Planned Unit Development
- ♦ Comprehensive Planning
- ♦ Written Agreements



VOLUNTARY CONTAMINANT SOURCE MANAGEMENT STRATEGIES

Voluntary contaminant source management strategies provide information, education, and tools to stakeholders to motivate people within a watershed and/or wellhead protection area to voluntarily take actions or change their behavior to protect the drinking water source. These strategies also take advantage of the willingness of landowners to voluntarily manage their land to improve and maintain water quality.

The following are examples of voluntary contaminant source management strategies:

- ♦ Land acquisition provides for the permanent protection of sensitive areas.
- ♦ Donations of land (probably the most attractive method of land acquisition) allow communities to permanently acquire and protect sensitive areas.
- ♦ Purchasing land through market value transactions or bargain sale purchases (charitable transactions that usually involve a tax deduction) allow communities to permanently acquire land but at some monetary cost.
- ♦ Conservation easements may be used to restrict the landowner's use of the property. Conservation easements may be purchased or donated and taxes on the property are generally reduced to reflect the land's limited use.
- ♦ Voluntarily limiting development, through strategies such as cluster and planned unit development, can be used to protect sensitive recharge areas. (See non-structural contaminant source management strategies for more information about cluster development and planned unit development.)
- ♦ Comprehensive planning is a process a community goes through to identify current zoning and determine future land uses throughout the community. Comprehensive plans may include zoning and protection programs for existing and future sources of drinking water.
- ♦ Written agreements between landowners and water suppliers can be used to protect source waters. The most common written agreements are conservation easements that provide landowners with tax benefits or payments in exchange for legal restrictions on their property. Other types of written agreements (e.g. development agreements) can be developed to serve the specific needs of both parties involved.

In some states Drinking Water State Revolving Loan Fund (DWSRF) set-aside funds may be used to acquire land. For more information about how your state uses the DWSRF, visit www.epa.gov/safewater/protect/swfasf.html.

Voluntary Strategies



- ◆ Monitoring
- ◆ Water Conservation
- ◆ Agricultural Best Management Practices (BMPs)
- ◆ Other Land Management Activities

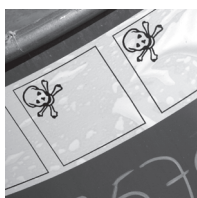
- ◆ Non-regulatory monitoring can be used to measure the effectiveness of protection strategies. Monitoring may show compliance with drinking water standards and detect problems sooner rather than later. Monitoring usually involves regular sampling and testing for contaminants of concern and should be conducted in cooperation with other mandatory monitoring programs. Monitoring may also concentrate on specific areas of concern.
- ◆ Water conservation reduces the volume of water withdrawals and may ensure adequate recharge to an aquifer, protect against saltwater intrusion in coastal areas, and reduce contaminant movement toward a well or intake.
- ◆ Agricultural best management practices (BMPs) may be adopted voluntarily by producers. Often financial incentives are available to encourage producers to install BMPs (e.g. vegetated buffer strips and animal waste control structures.)
- ◆ Other land management activities may be adopted to reduce threats to drinking water sources. Often these environmentally friendly activities benefit ecosystems and the quality of life in communities. Examples of drinking water source-friendly land management activities are planting native vegetation in rural and urban landscapes and using integrated pest management instead of synthetic pesticides.

For a listing of the financial incentives provided by the US Environmental Protection Agency, the US Department of Agriculture, the US Department of the Interior, and other federal government sources, access a copy of *Funding for Source Water Protection Activities* at www.epa.gov/safewater/protect/pdfs/guide_swp_swp_funding_matrix.pdf.

Notes

Voluntary Strategies

- ◆ Household Hazardous Waste (HHW) Collection Programs
- ◆ Public Information, Education, and Participation Programs
- ◆ Smart Growth



- ◆ Household hazardous waste (HHW) collection programs can motivate and provide assistance to people so they may properly dispose of several household products which contain hazardous materials. If these HHWs were dumped into sinks and storm drains or on the ground, they could contaminate the drinking water source. Individuals need to be educated about what these wastes are and how they may be properly disposed of. HHW collection days or permanent drop-off locations give people excellent opportunities to dispose of their waste. If incorporated with educational activities, they may also serve as educational opportunities and a great way to get citizens involved in drinking water source protection.
- ◆ Public information, education and participation programs give community members the information, education and opportunity to act responsibly. These kinds of programs can build public support for regulatory programs, when and if regulatory source water protection strategies are necessary. Road signs marking wellhead and watershed protection areas especially grab people's attention.
- ◆ "Smart growth" is a term used to describe the various land use management strategies used to combat urban sprawl. A number of these land use management strategies also may improve water quality and protect source water. For more information about smart growth, refer to *Smart Growth for Clean Water: Helping Communities Address the Water Quality Impacts of Sprawl* at www.nalgep.org/issues/smartgrowth.

Notes

Non-Structural Strategies

Land-focused Strategies

Large-lot zoning, Cluster development, Planned Unit Developments (PUDs), Transfer of Development Rights

Home and Business-based Strategies



NON-STRUCTURAL CONTAMINANT SOURCE MANAGEMENT STRATEGIES

Non-structural contaminant source management strategies encourage or require the use of methods and/or techniques that serve to protect source water. Most non-structural contaminant source management strategies focus on the way activities within the source water protection area are done; a few others focus on redirecting activity away from the source water area.

Land use plans may be adopted and other techniques used to concentrate development in less damaging areas so that sensitive areas may be preserved in a more natural state and the quality and quantity of drinking water in the community may be preserved. Non-structural contaminant source management strategies that focus on land use and development include:

- ◆ Large-lot zoning to reduce the impact of residential development by limiting the number of units within the area.
- ◆ Cluster development to allow smaller residential lots to be clustered together. This gives developers the opportunity to preserve more open space and natural areas and reduce the amount of impervious surfaces (paved surfaces and rooftops). This also reduces the developer's costs on utilities, roads and other paving. Cluster development can also be used to preserve natural buffers and groundwater recharge areas.
- ◆ Planned Unit Developments (PUDs) are cluster developments that allow a wider range of land uses, not just residential land use. Comprehensive development of the site allows for a greater amount of flexibility, cooperation and shared land uses. Larger, contiguous open spaces and natural features can also be retained. The built environment may be situated in such a way to minimize the impact on water quality.
- ◆ The Transfer of Development Rights transfer development from within protected areas to locations outside the protected area. This is an effective but administratively expensive and complex zoning tool used for wellhead protection.



A number of non-structural contaminant source management strategies are home and business-based and focus on the wise use and maintenance of materials and machines. Home and business-based non-structural contaminant source management strategies include:

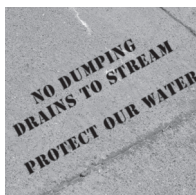
- ♦ Proper use and handling of potentially hazardous materials (e.g. following manufacturer's direction to apply and store pesticides, recycling used oil);
- ♦ Proper use and maintenance of machinery that stores or disperses potentially hazardous materials (e.g. keeping fertilizer equipment properly calibrated, inspecting storage tanks for leaks); and
- ♦ Use of environmentally friendly products (e.g. low sudsing, low phosphate, biodegradable detergents at car washes.)

Notes

Structural Strategies

Urban-focused Strategies

Drainage requirements, Storm water ponds, Infiltration basins, Porous pavement, Grassed swales, Constructed wetlands



STRUCTURAL CONTAMINANT SOURCE MANAGEMENT STRATEGIES

Structural contaminant source management strategies involve building structures or devices to prevent contamination and maintain or improve source water quality. Structural contaminant source management strategies prevent leaks or contamination or stop leaks at their source, divert hazardous or toxic components of a waste stream, or encourage the filtration or infiltration of wastewater to allow natural processes to remove contaminants.

Structural contaminant source management strategies built in an urban environment are most effective, both in cost and in operation, when they are built into developments from the very beginning. Communities can adopt subdivision controls to add specific conditions to development and regulate the division of land into lots. Structural contaminant source management strategies for the urban environment include:

- ◆ Drainage requirements to assure a subdivision's drainage system is managed with water quality and recharge in mind. Advanced engineering designs are used for roads within the subdivision; for example, on-site infiltration is used instead of curbs and gutters. Storm water and road runoff may be pre-treated to reduce contaminant loads. Storm water may be retained on-site for recharge.
- ◆ Storm water ponds to hold runoff to reduce flooding and remove suspended solids. Up to 90% of suspended solids may be removed if water is held over 24 hours.
- ◆ Infiltration basins or trenches built to trap and hold water so that it allows percolation and recharges the groundwater.
- ◆ Porous pavement to let precipitation infiltrate into the ground before it can runoff, thus effectively eliminating the problems associated with runoff. Porous pavement needs porous soils and gently sloping land to work effectively. It can remove both suspended and dissolved solids. One problem with porous pavement is that it may fill up with sediment and crack during freeze/thaw periods.
- ◆ Grassed swales (i.e. constructed, grass-lined channels) to direct runoff and remove particulates. Grassed swales allow some storm water infiltration and pollutant removal on-site and reduce the speed of storm water runoff.
- ◆ Constructed wetlands to remove both suspended and dissolved solids. Constructed wetlands can also be used to control storm water runoff.

Impervious surfaces (e.g. paved surfaces and rooftops) often contribute to non-point source pollution and can impair the quality of source water. Precipitation runs over these surfaces, picking up and transporting whatever lies on the surface. A balance needs to exist between the amount of impervious surfaces and an area's drainage system.

Structural Strategies



- ♦ Machinery or Operations-focused
- ♦ Vegetative Strategies
- ♦ Agricultural Best Management Practices (BMPs)

Structural contaminant source management strategies associated with machinery or operations include:

- ♦ Secondary containment structures, such as oil-retaining catch basins, containment berms for above ground storage tanks, or impervious surfaces for tank placement;
- ♦ At animal feeding operations, earthen ridges or diversion terraces to direct surface flow away from animal waste;
- ♦ Leak detection devices on storage tanks, including automatic tank gauges, vapor monitoring, and groundwater monitoring;
- ♦ Segregated floor drains from wastewater carrying hazardous or toxic wastes; and
- ♦ Devices to collect and store wastewater for proper disposal.

Some structural contaminant source management strategies use vegetation to filter out contaminants before they reach water bodies or seep into groundwater. Vegetation can slow the speed of runoff to prevent erosion and mitigate the damage caused by runoff over farmland, roads, or in urban areas. Examples of vegetated structural contaminant source management strategies include constructed wetlands; vegetated buffer strips along shorelines; or grassed swales or depressions that collect runoff, encourage infiltration, or reduce erosion.

In rural areas contaminant source management strategies called best management practices (BMPs) can be used to maintain and improve water quality. BMPs vary according to the type of agriculture practiced in a region. For example, in forests BMPs are used in the design and construction of haul roads, for skid trails and landings, for post-disturbance erosion control, for seasonal operating restrictions, and for helicopter logging. In agricultural settings, BMPs include the judicious use of agricultural chemicals, rotational grazing, animal waste management, contour farming, crop rotation, conservation tillage, terraces, buffer strips and grassed waterways.

Source Water Protection: What Works Best

A combination of regulatory and voluntary strategies that addresses a community's specific characteristics and needs -
a source water protection program tailored to fit the priorities of the community.



A variety of contaminant source management strategies are available to prevent pollution, control contaminants at the source, or treat wastewater. One strategy alone usually is not sufficient; a combination of strategies work best. In choosing the most appropriate measures, local government officials and water system operators should consider their situations, and may need to prioritize the implementation of specific strategies to make the most of the resources available to them.

Local government officials should look creatively at existing ordinances and regulations. They may be able to use rules passed for other reasons to address source water issues. For example, if special permits are allowed when necessary to protect public safety or health, it is possible that they could be used for source water protection.

The selection of contaminant source management strategies will be based on a variety of factors, including the physical properties of the watershed (i.e. annual precipitation, soil type and drainage, groundwater and surface water hydrology, and space limitations), land uses and potential contaminants, type of contamination problem (e.g., point source or nonpoint source), public acceptance of measures, cost, maintenance needs, and aesthetics.

In cases where the drinking water source crosses jurisdictional boundaries, regional cooperative agreements and authorities can be used to protect source water. For example, in many cases, surface water is taken out of major river systems that drain huge, highly industrialized watersheds. A community can still protect its source water by:

- ♦ Developing a knowledge base of the entire source and the contaminant potential that exists.
- ♦ Knowing the treatment plant's capabilities and limitations.
- ♦ Establishing a monitoring and communication network.
- ♦ Preparing a contingency plan with specific emergency response procedures.
- ♦ Working with upstream and downstream communities to develop a plan to protect the resource.

Contingency Planning



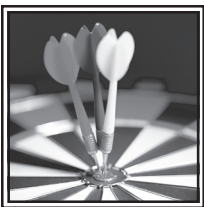
Plan of Action in Case of:

- ♦ Hazardous Spills
- ♦ Emergencies
- ♦ Contamination
- ♦ System Failure
- ♦ Increases in Demand

SOURCE WATER PROTECTION THROUGH CONTINGENCY PLANNING

Contingency planning is a blueprint for what to do when a potential threat becomes an imminent threat. It helps a community plan in anticipation of a contamination event. It also helps local officials make well thought-out, educated decisions, even when they are quick decisions made under stress. For example, a contingency plan would outline options for a community when a railroad car full of hazardous waste derailed and spills its contents onto the ground 150 feet from one of the community's wellheads. Having a contingency plan increases the likelihood that correct and immediate action will be taken and any damage, both in the long and short term, will be minimized.

Getting the community involved in the early stages of contingency planning also means the community is aware of their role and civic responsibilities under the plan. Opportunities for cooperation and the sharing of resources may also occur. Because community members are aware, they are more likely to respond quickly to community needs in case of an emergency.



Major Point to Remember

Ideally the community should also be involved in the development of the contingency plan. Only through community involvement can the plan truly reflect the values and priorities of the community.

Contingency Planning

Basic Plan:

- ♦ Contact Information to Mobilize the Emergency Response Team

Full Plan:

- ♦ Identify Potential Threats
- ♦ Formulate Response Scenarios
- ♦ Determine a Trigger Point for when to Respond



The most basic contingency plan consists of a phone list of everyone to call in case of an emergency. This list is often the community's emergency response team. The team list should include the names of the most current contacts, their resources and responsibilities, and their contact information (phone, fax, etc.). Contingency plans may also identify agencies, departments and consultants beyond those on the immediate emergency response team. The listing should include their scope of services and the expertise of each contact. The nature of the emergency will determine exactly who will be needed in a particular case. In some cases, sources of financial support, such as Federal Emergency Management Agency and U.S. Department of Homeland Security, will be needed. This information must be kept current and serve as a "living" document. Old, out-of-date information is absolutely useless in an emergency situation.

A more extensive contingency plan builds on the information obtained in the drinking water source assessment's Contaminant Source Inventory. An extensive contingency plan:

1. Identifies potential threats to the drinking water source;
2. Formulates responses to various threats. Once potential threats are identified, a variety of scenarios, or "what if" type statements are developed to help the community decide what to do if any potential contamination threats are not contained and threaten or contaminate the community's drinking water. The goal is to prevent and/or minimize contamination or obtain an alternate drinking water supply; and
3. Determines a trigger or signal for when to respond. It is important the community accurately recognize the nature of the threat and tailor the response accordingly.

The contingency plan should list the various resources, materials, tools, and personnel that are organized and are available to respond to an emergency. This list must also be kept current.



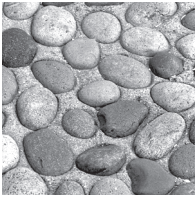
Those who are most likely to be directly involved in any emergency response must be involved in the development of the contingency plan. People who work with or transport hazardous chemicals, especially those in the wellhead or watershed protection areas, should also be involved in the development of the contingency plan. More than likely, these specialists will be the ones reporting any emergency, and they will also be the ones who have the materials and expertise to manage an emergency.

Notes

Contingency Planning

Long-Term Plan:

- ♦ Identify Future Supplies to Accommodate Growth
- ♦ Comprehensive Monitoring Program



A contingency plan should also address the potential long-term replacement of the existing drinking water supply. This part of the plan would identify whether alternative drinking water sources exist, where they are, and how they can be obtained. The costs of replacing the current source of drinking water should also be analyzed. This analysis often can be used to clearly show local decision-makers and the community how valuable the current, good, clean, safe drinking water supply is to the community. Actions taken to maintain its quality may, in the long run, keep the community from making costly investments in an alternative drinking water source.

The most successful drinking water source protection programs include provisions to monitor and periodically evaluate the program's effectiveness through water quality and site monitoring. Program evaluation may include routine monitoring, monitoring to evaluate contaminant source management strategy effectiveness, special studies, and the development of an early-warning system.

Notes

Source Water Protection

It is because of people that we protect drinking water sources, but it is only through people that we can do so.

Source Water Protection **MUST** begin with an active and involved team of community representatives.



Successful source water protection efforts meet the needs of the community as a whole. When developing a source water protection program, communities need to include a variety of stakeholders. At the very least, relationships and lines of communication should be established with the following stakeholders:

- ◆ County departments and agencies
- ◆ City departments and agencies
- ◆ Utilities/service districts
- ◆ Regional agencies or region-wide nongovernmental groups
- ◆ State agencies
- ◆ Tribal leaders
- ◆ Federal agencies
- ◆ Private property owners/developers/property-owner associations
- ◆ Special interest associations, such as the Izaak Walton League and Kiwanis International
- ◆ Recreational interests
- ◆ Open-space preservation/environmental groups
- ◆ Public health officials
- ◆ Populations with special health issues, such as immune-compromised persons, senior citizens, and pregnant and nursing mothers

Teams and/or committees may also be built to provide consistent support, feedback and involvement in the source water protection process.

Groundwater Guardian

Groundwater Guardian is a program of The Groundwater Foundation that provides a framework for community action and groundwater protection by providing recognition, support, and lessons learned.



Groundwater Guardian (GG) is a program of The Groundwater Foundation that helps communities get organized to take action on behalf of groundwater. Groundwater Guardian:

- ♦ **Provides a framework for local action.** The real work of groundwater education and protection takes place on the local level. By starting or enhancing groundwater education and protection efforts with a strong local team and a clear framework for action, teams can be successful right from the start. Groundwater Foundation staff are available to coach interested individuals through the process of building and maintaining a GG team and adopting successful groundwater education and protection activities.
- ♦ **Takes advantage of lessons already learned.** There's no need to reinvent the wheel! Teams who enter GG benefit from years of other GG Communities' experience. New GG Communities can learn how other communities have organized to take action and be effective. GG provides new teams with a variety of networking opportunities to learn from others and make their groundwater education and protection efforts stronger.
- ♦ **Recognizes communities for their efforts.** Never underestimate the power of saying "thank you" for a job well done. Each year The Groundwater Foundation recognizes communities for the work they do to educate the public and protect groundwater. Earning GG recognition sets communities apart. GG designation also helps communities get positive attention for groundwater-related work that is all too often overlooked or taken for granted.
- ♦ **Provides an incentive to keep activities going year after year.** To be successful, groundwater education and protection must be ongoing. While the specific nature of the activities may change from year to year, recognition helps to make sure progress is made on a community's groundwater education and protection activities.

For more information about teams, team-building, or the Groundwater Guardian program, contact The Groundwater Foundation at 1-800-858-4844 or visit www.groundwater.org.